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ANNUAL

OF THE

UNIVERSAL MEDICAL SCIENCES

A YEARLY REPORT OF THE PROGRESS OF THE GENERAL
SANITARY SCIENCES THROUGHOUT THE WORLD.

EDITED BY

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AND

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ASSISTED BY

OVER TWO HUNDRED CORRESPONDING EDITORS, COLLABORATORS,
AND CORRESPONDENTS.

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VOLUME I.



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PREFACE.

THE preparation of this year's ANNUAL was, indeed, an arduous task, over one-half of the editorial staff having been prostrated by the epidemic of influenza which prevailed at the time the several sections were to be written. This, combined with illness among the assistants of the central department, rendered it impossible to finish the work as promptly as usual. While craving the indulgence of the readers of the work, the Chief Editor wishes to impress them with the fact that everything possible was done to avoid the twenty days' delay, and that words can hardly express his gratitude to the members of the associate staff, several of whom undertook their laborious tasks when hardly able to leave their beds. The improvements in this year's issue mainly consist in the creation of departments on subjects heretofore considered under general heads. Syphilis, for instance, under the editorship of Prof. J. William White, of Philadelphia, appears as a special section, replete with information that could hardly otherwise be presented satisfactorily. Surgical Mycoses, edited by Prof. Ernest Laplace, of Philadelphia, is another subject so treated, while that of Thoracic Surgery, by Prof. J. McFadden Gaston, of Atlanta, forms a special department, the value of which will become apparent.

Several sections will be found to have undergone modifications of value to the general practitioner. That of Oral Surgery, under Dr. R. Matas, of New Orleans, will be found to contain a review of the minor surgery of the teeth, limited in extent to the necessities of the physician. The department of

Orthopaedic Surgery, under Profs. Lewis A. and Reginald H. Sayre, of New York, has also been extended in scope, while that of Bacteriology, under Dr. Harold C. Ernst, of Boston, has received considerably more space. The section of Therapeutics, by Drs. J. P. Crozer Griffith and H. W. Cattell, also contains a *résumé* of the therapeutical applications of hypnotism.

All the improvements introduced into the 1889 issue have been continued, the patrons of the work having expressed their approval of them. The general index, however, has been made somewhat less bulky, the difficulty experienced in finding a desired heading having rendered this advisable. It will be found, however, that the shortening has mainly been done by avoiding blank spaces and concentrating lines.

It is with deep sorrow that the editor is compelled to record the death of Dr. Charles L. Weed, associate editor in the department of Otology. Dr. Weed was as faithful to his duties as he was true to his friends.

Before closing, the Editor again wishes to express his thanks to his publisher, Mr. Davis, whose labors in connection with the publication of the ANNUAL are entitled to the full recognition of the profession. Dr. C. Sumner Witherstine, of Germantown, Philadelphia, rendered great assistance in the revision of editorial material, and in many other ways greatly assisted the Editor, who was thereby placed under great obligation to him.

To Messrs. Burk & McFetridge, who, in spite of the difficulties occasioned by the epidemic, completed their chromo-lithographic work on the day promised, and to Mr. M. J. Lawson, manager of the printing department, through whose unremitting and painstaking efforts many difficulties were overcome, many thanks are due. Messrs. Fickinger & Stowell, wood-engravers, and Oldach & Co., book-binders, have furnished work the excellence of which examination will demonstrate.

Through inadvertence, the names of Drs. G. G. Sears and Algernon Coolidge, Jr., were omitted from the title-page of Dr. Shattuck's article on Diseases of the Stomach, in which work they assisted.

THE EDITOR.

PHILADELPHIA,
May 19, 1890.

Please address all communications intended for the Editor to 1632 Chestnut Street.

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TABLE OF CONTENTS OF VOLUME FIRST.

DISEASES OF THE LUNGS AND PLEURA,	Section A
BY JAMES T. WHITTAKER, M.D.,	
CINCINNATI,	
Professor of Theory and Practice of Medicine in the Medical	
College of Ohio, etc.,	
ASSISTED BY	
E. S. McKEE, M.D.,	
AND	
H. L. TAYLOR, M.D.,	
CINCINNATI.	
DISEASES OF THE HEART, PERICARDIUM, AND ARTERIES,	Section B
BY EDWARD N. WHITTIER, M.D.,	
BOSTON,	
Visiting Physician to Massachusetts General Hospital,	
ASSISTED BY	
H. F. VICKERY, M.D.,	
BOSTON,	
Assistant in Clinical Medicine, Harvard Medical College, etc.,	
AND	
E. M. GREENE, M.D.,	
BOSTON,	
Pathologist to Carney Hospital and Boston Dispensary.	
DISEASES OF THE MOUTH, STOMACH, PANCREAS, AND	
LIVER,	Section C
BY FREDERICK C. SHATTUCK, M.D.,	
BOSTON,	
Jackson Professor of Clinical Medicine, Harvard University,	
etc.,	
ASSISTED BY	
G. G. SEARS, M.D.,	
AND	
ALGERNON COOLIDGE, JR., M.D.,	
BOSTON,	
District Physician to the Boston Dispensary.	
DISEASES OF THE INTESTINES AND PERITONEUM,	Section D
BY W. W. JOHNSTON, M.D.,	
WASHINGTON,	
Professor of Theory and Practice of Medicine in the Colum-	
bian University, Washington, D.C.,	
ASSISTED BY	
HENRY B. DEALE, M.D.,	
WASHINGTON.	
GASTRO-INTESTINAL DISEASES IN CHILDREN,	Section E
BY L. EMMETT HOLT, M.D.,	
NEW YORK,	
Professor of Diseases of Children in the New York Polyclinic.	

ANIMAL PARASITES AND THEIR EFFECTS,	Section F
BY JOSEPH LEIDY, M.D., LL.D.,	
PHILADELPHIA,	
Professor of Anatomy in the University of Pennsylvania, etc.,	
AND	
CHARLES S. DOLLEY, M.D.,	
PHILADELPHIA,	
Professor of General Biology in the University of Pennsylvania.	
DISEASES OF THE KIDNEYS, BLADDER, AND SUPRA- RENAL CAPSULES,	Section G
BY JAMES TYSON, M.D.,	
PHILADELPHIA,	
Professor of Clinical Medicine in the University of Pennsyl- vania, etc.,	
AND	
ALLEN J. SMITH, A.M., M.D.,	
PHILADELPHIA,	
Assistant Demonstrator of Pathology in the University of Pennsylvania.	
FEVERS,	Section H
BY J. C. WILSON, A.M., M.D.,	
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Physician to the Jefferson Hospital, etc.,	
AND	
SOLOMON SOLIS-COHEN, A.M., M.D.,	
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Professor of Clinical Medicine, Philadelphia Polyclinic, etc.	
SCARLET FEVER AND MEASLES,	Section I
BY LOUIS STARR, M.D.,	
AND	
W. M. POWELL, M.D.,	
PHILADELPHIA.	
DIPHTHERIA, PERTUSSIS, AND PAROTITIS,	Section J
BY J. LEWIS SMITH M.D.,	
NEW YORK,	
Clinical Professor of Diseases of Children in the Bellevue Hos- pital Medical College, New York, etc.,	
ASSISTED BY	
FREDERICK M. WARNER, M.D.,	
NEW YORK.	
RHEUMATISM AND GOUT,	Section K
BY N. S. DAVIS, A.M., M.D., LL.D.,	
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Professor of Principles and Practice of Medicine and Clinical Medicine in the Chicago Medical College, etc.	
DIABETES,	Section L
BY JAMES TYSON, M.D.,	
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Professor of Clinical Medicine in the University of Pennsyl- vania, etc.	
SYPHILIS,	Section M
BY J. WILLIAM WHITE, M.D.,	
PHILADELPHIA,	
Professor of Clinical Surgery in the University of Pennsyl- vania.	
VOLUME INDEX,	Section N

DISEASES OF THE LUNGS.

BY JAMES T. WHITTAKER, M.D.,

ASSISTED BY

E. S. MCKEE, M.D., AND H. L. TAYLOR, M.D.,

CINCINNATI.

TUBERCULOSIS.

Etiology.—The most valuable contributions of the year are the further papers of Cornet ⁴_{Mar. 25 to Apr. 8} on the dissemination of tuberculosis by sputum, and of Bollinger ³⁴_{Oct. 22} on the attenuation of tubercle bacilli by dilution.

Cornet's views are best summed up in his final reply ⁴¹_{Mar. 25} to Neuhaus; first, that rabbits are not infected by association with diseased rabbits, because these animals do not expectorate; and, second, to the objection that nurses are not affected, that of 100 nurses deceased (from statistics based on the records of 87,000 cases, a number large enough to justify conclusions) 63 died of tuberculosis. Up to the age of 50 years the proportion of deaths from tuberculosis among them is 73 per cent. Nurses of 17 years of age have their lives curtailed twenty-one and one-half years as compared with other people. A nurse aged 25, for instance, has the duration of life of another individual not a nurse aged 58, this mortality being mainly due to tuberculosis. He asks, "Is it sensible to believe that all these cases are inherited?"

To the objection that dry pulverization of tubercle bacilli does not produce the disease, he says that the difficulty is in the reduction of the dust to the dry state. In his 200 to 300 experiments, infection took place whether the dust was wet or dry. "How is it," exclaims the author, "if heredity plays such an important rôle, that orphan asylums under perfect prophylaxis show no tuberculosis?" Nuremberg's orphan asylum, with 400 children, has had but 2 or 3 cases of tuberculosis in eight years.

As to milk, it is undeniable that it will convey tuberculosis; but milk does not enter the lungs, and, in the great majority of

cases, it is the lungs which are first attacked. It is true that Jöhne reports a case of tuberculosis in a foetal calf—the sole case on record—against which I cite the statistics of our slaughterhouse: Among 320,000 calves 17 were tuberculous, and of 100,000 sheep 3 were tuberculous. It is certainly remarkable, if heredity plays such an important rôle, that while tuberculosis is so common in cattle as to have been found in 8,000 of 398,000 animals, not a single case was found in the calves.

The objection of Fraenkel, that physicians so rarely contract the disease from the patients, is met by the fact that the visit is so short. It is those especially who dust rooms, make beds, and have charge of the wash that are most exposed. As to kissing, it is confessed that the disease may be so carried, but not then directly to the lungs, but to the glands about the mouth and neck, to constitute *serofula*. Children are especially thus endangered. In all my hundreds of experiments the lymph-glands nearest the point of infection are affected first. Thus infection from the mouth, nose, ear, anywhere on the right side, is followed by infection of the glands on the right side; the left remains sound for eight weeks, when it, too, is affected. But the point of infection can always be ascertained with absolute certainty.

Bollinger³⁴ made a preliminary report on the two years' work of his assistant, Gebhard, which is to appear in full. The work was incited by the observations of Hirschberger,³²⁶ B.4,p.500 which proved that the milk of tuberculous cows was infected in 55 per cent. of cases. It was feared that the milk of large dairies might be contaminated by infected milk from one cow, but the very reverse was found to be true. Thus 2 cubic centimetres (32 minims) of market milk collected from ten different sources was injected, intraperitoneal, into guinea-pigs. The animals were killed in five to six weeks, and section showed them all to be sound. Then milk was taken directly from the healthy udder of tuberculous cows and diluted definitely with water. It was then seen that virulence was lost in one case with a dilution of 1 to 40, in another 1 to 50, and in a third 1 to 100. It is thus shown that infected milk of tuberculous cows loses its virulence with a certain dilution, but that the long-continued use of such milk may be dangerous, as may also be the continued use of milk from one cow. Milk is rendered less dangerous by admixture with other milk, for the advancing dis-

ease in one cow increases the virulence of its milk, while dilution with milk of other cows lessens virulence. Continued use of so-called warm milk from one cow should be abandoned utterly. Sputum was next tested by dilution, and it was seen that an enormous difference exists between milk and sputum, inasmuch as dilution of sputum 1 to 100,000 does not affect its virulence, no matter how it was introduced into the body,—subcutaneous, by intra-peritoneal, or by inhalation. On the other hand, feeding of 2 cubic centimetres (32 minims) of sputum in a dilution of 1 to 8 gave no positive result.

Experiments were next made with pure cultures. Positive results were obtained with a subcutaneous injection of 1 cubic centimetre (16 minims) of a dilution 1 to 400,000, as also with an inhalation of 5 cubic centimetres (80 minims) of the same dilution of a beef-peptone-glycerin-agar culture. Pure cultures, therefore, do not lose virulence in a dilution of 1 to 400,000.

By means of a micrometer for counting blood-corpuscles it was next established that bacilli, to the number of 820, sufficed to engender a fatal tuberculosis. As to the mode of infection or local disposition, that the subcutaneous tissue, the peritoneum, and the lungs were favorable to the reception and multiplication of the tubercle poison, and about alike so, while the intestinal tract was much more resistant, it was evident that the poison in minimum quantity would not at all affect certain organs. Thus, in intra-peritoneal injection the peritoneum remains perfectly free in two-thirds of the cases, while the poison fixes itself and multiplies in the lymph-glands and spleen as much more favorable organs. The sequence of preference is as follows: Lymph-glands, spleen, lungs, liver and heart, and, last, kidneys and genitals. The organ infected is, therefore, not always determined by the seat of infection; so that a lung tuberculosis is not always to be referred to inhalation.

The author weakens this conclusion with the following observation: After subcutaneous injection an abscess containing bacilli is always formed; the nearest lymph-glands are thereupon affected, and later and more slowly the internal organs, especially the spleen. After inhalation, in more than half the cases, the bronchial glands as well as the lungs are found to be affected, and, sooner or later, the spleen; while other organs, as the liver and peritoneum, remain free.

In favor of an individual disposition is mentioned the fact that the extremely susceptible guinea-pig may remain unaffected by intra-peritoneal injection of 1 cubic centimetre (16 minims) pure culture, 1 to 200,000 dilution, while injection of the same quantity of a greater dilution, 1 to 400,000, may give a positive result in another animal. It is thus shown that milk may be infectious when the scanty bacilli are undiscoverable by the microscope; so that negative evidence in the examination of sputum does not exclude the disease. The finest and truest test is inoculation. The extent and intensity of affection depends directly upon the number of germs introduced.

Invasion by Inheritance.—As a result of the investigations of Cornet, the question of inheritance sinks in value more and more; so that, while it may be admitted in exceptional cases of internal tuberculosis, it may be probably rejected altogether in the case of phthisis pulmonum. Malvoz and Browvier^{June 8}⁶ lately read a paper at the Liège Medico-Chirurgical Society, in which they demonstrated the occurrence of tubercle bacilli in a foetal calf, thus confirming a similar observation of Jöhne in 1885, and affording proof of the actual transmission of the tubercular virus from the maternal to the foetal organism. One of their specimens was from an eight months' foetus found in the uterus of a tuberculous cow. The liver contained numerous grayish-white granulations; and small cretaceous yellowish points were found in the centre of the lymphatic glands at the hilus of the liver and root of the lung. Sections of each of these parts displayed well-marked giant-cells and numerous bacilli. In another case, that of a calf of six weeks, similar but more advanced lesions were found. The same subject was also recently discussed at the Paris Society of Biology, in a paper by Sanchez-Toledo,³⁶³_{no. 21} who traced the history of the question from the experiments of Strauss and Chamberland with anthrax. Unlike Martin, Landouzy, and others, the author did not find evidence of transmission of the tubercular virus from the maternal to the foetal organism. In one set of experiments he injected pure cultures of Koch's bacillus into the jugular vein of pregnant guinea-pigs; but neither in the blood nor the organs of the foetuses was he subsequently able to detect any trace of the microbe. Similar negative results followed experiments of injections into the pleural sac and beneath the skin of pregnant guinea-pigs; for,

although the animals themselves became tuberculous, their foetuses were quite free from the infection.

Maffucci⁵⁰,_{B.S.No.7} maintains that the tubercle bacillus introduced into the impregnated egg (chicken) does not perish and does not arrest development, but is incorporated into the embryo to show itself in the developed fowl, chiefly in the liver, infection taking place through the area vasculosa, whence it finds its way to the liver.

Invasion by the Alimentary Canal—Food and Drink.—The question of tuberculous meat, according to Niven,¹⁵_{Sept.} is a difficult one. Careful and long observation seems to show that the meat of tuberculous animals does not necessarily convey the disease, and it is probable that this is specially true of cases of chronic disease in the ox. Still, it is certain that the tubercle bacilli are liable to be scattered through the body by the blood-vessels, and it is, therefore, equally certain that the micro-organisms of the disease find a temporary lodging in the flesh. Experimental evidence as to the infective character of such flesh varies. Kastner³⁴,_{Aug. 20} feels justified, from the uniformity of the results, in concluding that "the results obtained support the view that no great amount of danger is to be feared from eating the flesh of tuberculous cattle, unless the tuberculous disease has formed nodules in the flesh—a very rare occurrence." He would, however, boil the meat of such cattle before use. With regard to Toussaint and Peuch's experiment, he points out that pigs are liable to spontaneous tuberculosis. He also appeals to Bollinger's inquiry, in which it was found that a class of people specially liable to the consumption of tuberculous meat—"knackers"—suffered less from tuberculosis than the general population.

Steinheil's experiments³¹,_{Oct. 31} are a sort of continuation of Kastner's, only that they were made with human flesh from patients who had died of tuberculosis. To obtain the juice, one or both psoas muscles, with the surrounding fat and connective tissue, were removed from the body, all the fascia, fat, and large vessels carefully removed, and the flesh washed under running water. The rest of the proceedings appear to have coincided with Kastner's. The results are, however, strikingly different. Nine bodies were examined, injections being in each case made into 2 guinea-pigs. With the exception of one instance, in which both guinea-pigs

died of sepsis, all were successful, 15 out of 16 guinea-pigs contracting tuberculosis. Steinheil is of opinion that the lungs are the organs from which the infection is in greatest degree carried to the flesh.

Behrend¹⁰²¹ gives an interesting review of the present position of scientific thought as regards the meat of tuberculous animals. The tendency is to condemn the carcass, however slight the tuberculous lesions. The Jews notoriously suffer less from tuberculosis than their neighbors, and testimony to this effect is produced. Striking statistics are given, showing that before and at the various ages succeeding birth they have a lower death-rate than Christians. It is suggested that their comparative immunity from phthisis is due to the greater care exercised in the selection of the meat which they consume.

Infection by the alimentary canal occurs usually through fluid food-milk. Upon this question there is now no probable doubt. Aside from the report of Bollinger, already quoted, a most important contribution has been made by Ernst,⁵ showing, and emphatically: (1) that milk from cows affected with tuberculosis in any part of the body may contain the virus of the disease; (2) that the virus is present whether there is disease of the udder or not; (3) that there is no ground for the assertion that there must be a lesion of the udder before the milk can contain the infection of tuberculosis; (4) that, on the contrary, the bacilli of tuberculosis are present and active in a very large proportion of cases in the milk of cows affected with tuberculosis, but with no discoverable lesion of the udder. These conclusions are also established by Hirschberger.

In order to test the danger from the use of milk from cows affected with tuberculosis, Hirschberger⁵⁷ has employed specimens from 20 such animals for making inoculation experiments on guinea-pigs. The greatest care was taken to preserve the strictest cleanliness and prevent infection from extraneous sources, and in every successful case the direct connection between the disease produced and the inoculation was proved by a post-mortem examination. Even in cases where a positive result was obtained, the most painstaking microscopical examination failed to discover tubercle bacilli except in one case, and in this the udder was affected. In the other cases the virulent character of the milk

was due either to spores or the bacilli were so few as to escape detection.

The proportion of successful results varied from 80 per cent., in cases where the tuberculous process was far advanced, to 33 per cent. where it was still confined to the lungs. The danger varied at different times, being present when spores from some focus of infection happen to be absorbed into the blood-current and are excreted by the milk. Hence the milk of a tuberculous cow should always be condemned. How necessary this is may be understood from the following extract^{2 Jan. 5}: "The owner of a valuable herd of cattle," says the author, "finding that a large proportion of them were tuberculous,—so large a proportion, indeed, as strongly to suggest infection by association in the sheds,—withdrew his milk from the market, and used it, unfortunately without boiling, for fattening his pigs, of which he has a large number, and on which he prides himself not less than on his cows. The result has been that the pigs have, almost without exception, been affected with the disease to an extent that has necessitated the slaughter of the whole stock. Another point of practical interest is, that he has not been able to discover nodules or other indications of localized tubercles in the cows' udders,—a condition still held by some to be necessary to render the milk capable of transmitting the disease." Hence also all milk should be boiled.

A careful analysis of 127 cases of fatal tuberculosis in children by Woodhead^{51 Oct.} showed that the disease selects particular organs by preference, as it were, at different periods of life. In the tabulated series it appeared that the intestinal canal was involved in only 43 of the 127 cases, while the mesenteric glands were involved in 100, of which 62 occurred between the ages of 1 and $5\frac{1}{2}$. The most common cause of primary localization of tuberculosis in the mesenteric glands was thought to be the use of milk containing the tubercle bacillus. Most of the cases in the table were breast-fed during that period.

Invasion by the Lungs—Sputum.—The work of the year has established almost to universal conviction that tuberculosis pulmonum is caused exclusively by the inhalation of dried sputum. This, the original postulate of Koch, met its conclusive proof in the studies of Cornet under his direction, a full report of which is published in English.¹⁰²² "We know now," concludes Cornet,

"that tuberculosis is caused, in the great majority of cases, by breathing the dried and pulverized sputum of consumptives. Those persons, therefore, who have to attend daily to the cleansing of the rooms and making of the beds of consumptives, and to the removal and cleansing of handkerchiefs and other cloths which have been used as receptacles of the sputum, are more in danger than others of inhaling the bacilli and thus infecting themselves. Therefore, as we have seen, the greatest number of infections occur in these years. With increasing age this work falls upon other, younger, and stronger shoulders, and the danger of infection is largely avoided, for, as I have set forth in another place, it is not the residence in the hospital, not the breath of the consumptive, which is dangerous, but singly and alone the inhalation of the dried sputum, which is mixed with the dust of the floor and the bed, and which particularly in the morning's bed-making and cleansing is whisked into the air, where it is likely to be breathed. We cannot wonder, therefore, that the older members, although they still remain at their duties as attendants upon the sick, are no longer infected so frequently as are those of younger age."

Biggs⁹ said that it seemed to him irrational to ascribe phthisis in man to its existence in animals, when for its transmission it required the ingestion of the meat or milk of those animals. Tuberculosis acquired in this way should affect the alimentary canal rather than cause pulmonary tuberculosis. There were many other more probable ways for the transmission of tuberculosis, the principal one being the inhalation of dried sputum of tuberculous patients. Moreover, the portion of the tuberculous animal consumed by man usually did not contain the tubercle bacilli. The bacillus was rarely present in milk, except in mammary tuberculosis. The author had said that tuberculosis was most commonly found in the bovine race, but Biggs had found that more than 60 per cent. of hospital patients who reached the autopsy-table showed well-marked lesions of pulmonary tuberculosis. Biggs closed his remarks by saying that the sputum was the chief agent for the transmission of tuberculosis, and while he believed that a larger number of cases occurred through infection from animals than was commonly supposed, yet he thought this number was very small compared with the number of cases of pulmonary tuberculosis. The whole question of infection by tuber-

culosis has in the past year narrowed itself down to infection by the sputum and by milk, and this fact may be regarded as the acquisition of the year. Further consideration of this question falls, therefore, now under the head of prophylaxis.

To finish with the subject, mention may be made of two other modes of infection possible, perhaps, but highly improbable, one by the sweat of patients and one by consumption of the flesh of fowls:—

Di Mattei²⁵ _{July 20} finds that in the sweat collected without any special precaution from the skin tubercle bacilli may be present, and that the tubercular infection may be produced in animals either by cultivation of the bacillus or directly by the sweat. But in the sweat collected after washing and the use of proper anti-septics tubercle bacilli are not found, and cultivations made with it remain sterile. Inoculations in animals, also, give no result. Specific bacilli, therefore, are not eliminated by the skin.

Cameron⁶ _{July 27} read a paper on tuberculosis in fowls. He had from time to time received dead fowls for the purpose of analysis. They were individuals from large numbers that had died very rapidly, and, as it was believed, from poisoning, malicious or accidental. No poison was found, but, on the contrary, death was due to tuberculosis. The lungs, liver, and spleen were enlarged and much affected. In one case, where about fifty hens had died within a period of three or four months, the deaths commenced to take place some weeks after the arrival of a consumptive patient in the house near which the hens were kept. There was little doubt that the sputa of patients affected with phthisis were devoured by fowls, and no doubt, too, the inspissated sputum, in the form of dust, found its way into their lungs. Evidence was adduced to show that fowls affected with tubercle sometimes—when consumed as food—induced the disease in man. The bacilli in the fowl, though closely resembling the bacillus tuberculosis of man, were decidedly smaller. In this connection it might be well to remember that Straus and Wurtz¹⁰⁶¹ _{July, '88} fed eight hens a whole year with tuberculous sputum, each a whole handkerchief full every day, and failed utterly in producing the disease. Neither autopsy, microscopic inspection, nor inoculation demonstrated the presence of tuberculosis.

Infected Houses.—Flick⁷⁶⁰ _{June 1} continues his good work on the

infection of houses. He says: "In spite of all the sources of inaccuracy, which I have mentioned, the figures given, bearing upon tuberculosis in the Fifth Ward, of Philadelphia, for the year of 1888, point unmistakably to the fact that tuberculosis is not only contagious in the broad sense of that word, but that a house in which that disease has existed remains a centre of infection for an indefinite time. Upon no other theory than this can a rational explanation be given of the fact that whilst less than one-third of the houses of the ward became infected with tuberculosis during the twenty-five years prior to 1888, considerably more than one-half of the deaths from tuberculosis during the year 1888 occurred in those affected houses. Inasmuch as there were more than twice as many non-infected houses in the ward as there were infected houses, we should naturally expect a preponderance of deaths in non-infected houses. Why this great preponderance of deaths in infected houses?" The conclusion that houses once infected by tuberculosis retain that infection for some time is even more strongly borne out by individual cases than by the aggregate number of cases during the year.

Perhaps one of the most interesting lessons to be learned from this inquiry into the relation which the deaths from tuberculosis in the Fifth Ward during the year 1888 bore to those from the same disease during the twenty-five years prior thereto is that bearing upon marasmus and meningitis in children. It will be remembered that out of 22 deaths from these two diseases 17 occurred in houses which had been infected by tuberculosis of the lungs and the bowels in adults. It would appear from this that marasmus and tubercular meningitis in children are apt to be concurrent with tuberculosis of the lungs and bowels in adults; that is, where an adult is suffering from phthisis or consumption of the bowels in a house the children of that house are prone to develop marasmus or tubercular meningitis, and that these diseases are not apt to become centres of infection themselves.

Niven¹⁵ says: "Out of 45 cases investigated, I find that in 26 the disease was contracted in the house where death occurred, in 16 it was contracted in houses previously occupied, and in 3 this point is doubtful." Engelmann⁴ cites a number of such cases, all in corroboration of a fact thoroughly established by Cornet⁴ Mar. 22 to Apr. 8 in his model report.

MacMullen^{267 187} Nov. 15, 1886, Jan. calls our attention to the danger of sea-voyages with consumptive companions. One secures a berth, he says, in a cabin, be it in a two-, three-, or four- berth cabin, in a steamer or sailing-ship, bound, say from London to Australia. He goes on board, settles down, meets his fellow-voyagers, and finds that luck has associated him for the voyage with a highly-consumptive companion. The cabin is most likely very small, in no case large, for the size of a ship is no criterion as to the size of her cabins, even the largest vessels, especially steamers, having, as a rule, very small cabins in order to accommodate the greatest number of passengers possible on board. Naturally enough, the consumptive man will have a considerable dread of ventilation,—at least, such an amount of it as a healthy man would desire; and so at the very outset the healthy and ailing find their wishes not in accord. What follows? The healthy man, doubtless prompted by those feelings of humanity which generally contemplate suffering of any sort with pity, will probably waive any objections in favor of the invalid, with what danger to his own health I hope to be able to show.

Bennet²⁶⁸ on this subject says: "A diseased person, in trying to save himself, has no right to infect the sound public. Advanced consumptives ought not to be allowed to travel by sea in the present state of science, unless they can be isolated in single, well-ventilated cabins. I myself, a consumptive cured more than a quarter of a century ago, should now refuse to travel at sea in a cabin with a consumptive fellow-traveler in advanced disease, as I should refuse to inhabit the large hotels in the Engadine, where scores, nay, hundreds, of consumptives, in all stages of disease, now congregate every winter, poisoning the air which they breathe, in a climate where free ventilation—ventilation as I understand it—appears to me an impossibility. A friend of mine, a scientific physician, Jacoby, of Nice, tells me that he found tuberculous bacilli in the atmosphere of one of these hotels in July."

I have⁹⁹ Nov. 7 warned against a like danger in railway-, especially sleeping-, cars. It is startling to have to accept, but it is hard to dissent from, the following statements: "It would be difficult to conceive of a conjunction of circumstances more directly contributive to disseminate this disease, tuberculosis, than is offered

in the palace-car. It is always badly ventilated; the vestibule-car, especially, is close and hot, sixteen to thirty people being crowded into a space that might make a small hall in a house, but never a bedroom for a pair of human beings. Somebody is always hurt by a draught, so that windows are kept closed to prevent free ventilation, as well as the ejection of sputum, which is mostly deposited on the floors. Cuspidors never contain water, and are mostly used as waste-baskets or slop-jars, and the temperature is raised to a degree sufficient to rapidly disseminate infectious matter. With the gathering shades of evening the compartments containing the bedding are opened into the car to diffuse through it a disagreeable, musty odor. The traveler is treated to the luxury visible of clean sheets and pillow-cases, but the blankets, mattresses, carpets, and, worst of all, the curtains, remain the same until worn out. "Consider now that every car contains or has recently been occupied by a consumptive traveler, if only *en route* for change of climate, and that through ignorance, carelessness, or weakness, there comes to be deposited upon bedding, curtains, etc., tuberculous matter. What becomes of it, if it be not dried and disseminated throughout the car, or gradually incorporated into the lungs of the traveler?"

It is suggested, and we wish the suggestion might meet with a practical response, "that the plush, velvet, and silk hangings must go. Seats should be covered with smooth leather, that may be washed off; carpets replaced by rugs, to be shaken in the open air at the end of every trip, or, better still, abolished for hard-wood floors. The curtain abomination must give place to screens of wood or leather; blankets of invalids' beds be subjected to steam at a high temperature; mattresses be covered with oiled silk or rubber cloth, that may be washed off; and, above all things, invalids be provided with separate compartments, shut off from the rest of the car with the same care taken to shut out the far less offensive or dangerous smoke of tobacco. The cuspidors, half filled with water, should abound, as they now abound in every car, and consumptive travelers be provided with sputum-cups, which may be emptied from the car. For it is not necessary to say here that the sole and only danger lies in the sputum. The destruction of the sputum abolishes the disease. When the patient himself learns that he protects himself in this way as much as

others, protects himself from auto-infection, from the infection of sound parts of his own lungs, he will not protest against such measures."

"How many tuberculous invalids," says an editorial writer,^{99 Nov. 7} "travel to and from the South every Winter and Spring, and how many non-tuberculous but enfeebled people along with them. To point out that such are exposed on the fast through trains to especial dangers, dangers which can be diminished and should be minimized—this is not to be an alarmist."

Biggs^{170 June} states that a proof that the deductions drawn from the inhalation experiments on animals also hold true with regard to man is afforded by the remarkable example reported by Schwenninger, of the possibility of infection of man when placed under the same conditions in which animals are infected, *i.e.*, by impregnating the air with the tubercle bacillus. During the time that Tappeiner was conducting his inhalation experiments on animals the servant who had charge of them, a very robust man of 40 years of age, with absolutely no hereditary predisposition to the disease, and who had previously been perfectly healthy, notwithstanding the strong protestations and warnings not to enter or remain in the inhalation-room, disregarded these directions in order to show that this procedure was comparatively free from danger, and acquired in this way the same form of inhalation tuberculosis as had been produced in the dogs experimented upon. He died from tuberculosis after about fourteen weeks, and the autopsy revealed the presence of the same lesions as had been previously found in dogs that had been killed—only in him the disease was farther advanced, corresponding to the longer period of time.

Symptomatology.—In this field there is nothing new or worthy of record excepting the position of the tubercle bacillus, from the stand-point chiefly of diagnosis, to be studied later.

Ayer^{99 Aug. 8} discourses upon the mental state of consumptives, beginning with the *spes phthisica*. At least 6 of the 154 patients clung to a hope which under the circumstances was most unreasonable. One patient, upon the day of her death, insisted upon being dressed and upon walking across the room without help. She could not realize how weak she was and kept asserting that she was going to get well, and would burst into tears if any patient hinted that she might not recover. Another patient, 49 years of

age, was in the habit of visiting a mind-cure physician, and always returned in a happy state. Although hardly able to stand, she would report: "They tell me there is nothing the matter with me, so I know I am going to get well." Three days before her death she left the Home for fear of "taking consumption." This proportion of cases of marked *spes phthisica* is undoubtedly small when compared with the experience of private practice. Mason explains this circumstance by the fact that most of the patients had been informed previous to their admission that their condition was either serious or incurable. In many of the cases a strange indifference regarding the state of their health was noticed, and, as a rule, there was less anxiety shown regarding their condition than one would expect.

In explanation of most of these cases of mental disturbance it is not necessary to assume a tubercular deposit in the brain, for tubercular meningitis in the adult is not of frequent occurrence. Probably anaemia, oedema of the brain, and the hectic condition will account for most of the cerebral symptoms described.

No special form of brain disorder existed in these cases; on the contrary, there was the greatest variety of mental disturbances, ranging all the way from insanity adapted to asylum treatment down to the mildest form of delirium and the enviable "delirium of hope." There were no constant delusions nor hallucinations. Suspicion, uneasiness, and desire for change were most frequently noticed. In 2 of the cases the mental symptoms preceded by several months the discovery of pulmonary disease. In 4 cases the mental disturbance commenced during the last month, while in 3 cases the mind grew clearer during the last four weeks of life.

Pathology.—Dyspepsia—Studies on the Functions of the Stomach in Phthisis.—F. Schetty³²⁶ B.44, II.2 & 3, Sept. 5 says that, as all the investigations carried on have as yet failed to give us any specific against tuberculosis, we are obliged to combat the disease some other way, *i.e.*, by strengthening the organism and making it as resistant as possible to the action of the poison. The dietetic and the climatic treatments are, therefore, to be considered, and of these the most important is the former, since the latter cannot so often be carried out.

The results of his investigations were as follow: 1. The production of hydrochloric acid was in all the cases not diminished

in the morning, and in some of them even increased. There was a normal production of acid, both in the advanced cases and in those with morning fever. 2. The digestive power of the gastric contents was destroyed in no case; the length of time required in the digestion test was one to two hours, and corresponded to the normal condition. 3. The time required for digestion within the stomach in the afternoon and evening hours was not prolonged, and there existed, consequently, no motor insufficiency in the cases examined; for in all but 3 of the cases the stomach was empty after six hours, and in these there was no food remaining, but only some of the gastric secretion. The degree of advancement of the disease or the elevation of the body-temperature appeared to have no influence.

It seems certain, then, that the so-called gastric disturbances of many phthisical patients do not always depend upon gastric catarrh and a diminution of the secretions. It is of importance, therefore, to make, in every case possible, an examination of the secretion, in order to be able to determine the most suitable therapy. Cases in which the secretion is found normal are often suitable subjects for gavage, and will be benefited by it.

Klemperer^{4, 90} has attacked the same problem as Schetty, but his methods are a little different, and so are his conclusions. His test meal consisted of $\frac{1}{2}$ litre (1 pint) of milk and 2 white-bread rolls, the contents of the stomach being evacuated after two hours and examined. He tested the motor power of the stomach by giving a measured quantity of olive-oil—100 grammes (3½ ounces)—and seeing how much could be recovered at the end of two hours. As regards the color tests for acids, he remarks that the quantity of albumen and organic bases mixed with the acid influences the methyl-violet reaction, and that, where motor insufficiency of the stomach exists, the quantities of these compounds will for a given length of time be proportionately larger. In such cases the biuret reaction is of the greatest value, as when obtained it shows that the secretory activity of the stomach is sufficient even when the methyl-violet reaction fails. He found that in 2 cases of pre-tubercular dyspepsia the secretions of the stomach were normal, but that there was a little motor weakness to be detected by the oil test. This was not enough to be apparent to any less-searching method of examination, as it was found that seven hours after food the stomach was quite empty. In all his cases, 14 in number, he

found the motor power diminished; but, speaking broadly, the further advanced the phthisis, the greater the motor insufficiency. The secretory activity of the stomach is in early cases generally greater than normal; hyperacidity occasionally normal and seldom diminished. In the terminal stages of the disease it is greatly diminished.

Klemperer believes that chronic gastritis is the cause of all these anomalies, including the diminished secretion of hydrochloric acid. He attributes the hyperacidity of early phthisis to the effects of the motor weakness, as this allows the food to remain in the stomach longer than usual, and so act as a more powerful stimulus to its glands. Marfan and others have shown that the gastritis of the phthisical presents no histological peculiarities; there is no specific tubercular process. Only 12 cases of tubercular ulceration of the stomach have ever been reported, and in 7 of these there was extensive disease of the bowel. In 5 ulceration was found in the stomach only, but the patients were all in the last stage of pulmonary phthisis. Amyloid degeneration of the stomach, too, is very rare, and only found when other organs are affected in a very considerable degree.

Immerman¹³¹ discussed the question whether the anorexia observed in cases of phthisis was merely a form of digestive hyperesthesia or due to an actual disturbance of the gastric function. To settle this point experiments were instituted with the test meal of Leube and Riegel. Cases were chosen where the appetite was still good, as well as cases where there was disinclination for food, and also patients where the pulmonary affection was very advanced, especially those where high fever was present. In all cases the test meal was digested in six hours, even in those where the appetite failed, where dyspeptic feelings were present, the strength poor, and the fever very high. In one case even five days before death the meal was well digested. The probability, therefore, is that these gastric symptoms have a subjective or nervous character. The degree of acidity present one hour after the ingestion of a meal was the same as in the healthy condition, while the amount of pepsin showed its normal proportion. Immerman concludes from this that we ought to be more confident in the administration of food to phthisical patients than we usually are.

Chelmonski⁹²,⁵ sums up his conclusions as follows: In the

course of chronic phthisis, and independently of the fever, there is often found an absence of free hydrochloric acid in the contents of the stomach and a very small amount of pepsin. This composition of the gastric juice probably depends in part on anæmia of the stomach, due to the general cachexia and to a chronic fibrous endarteritis, and in part on a passive hyperæmia of the stomach, or rarely on any amyloid degeneration of the mucous membrane and of the arteries.

Grusdew⁵⁸⁶ ²¹ ⁶ ^{No.15; v.6, No.26; Oct.5} suggests that the gastric disturbances so frequently associated with phthisis may be, in part at least, due to the copious night-sweats, and that the indigestion so often met with in soldiers may very probably be connected with the large amount of perspiration occasioned by their long marches and heavy fatigue duty. He has found, by a series of experimental observations, that when a large amount of perspiration is induced in healthy subjects the acidity, the quantity of free hydrochloric acid, and the digestive power of the gastric juice are diminished, and also that the quantity of the fluid secreted by the stomach is less than under ordinary circumstances.

Lungs and Liver.—Pleshivtseff¹⁰¹¹ ⁶ ^{No.85, 88 & 89; Aug. 31} has weighed and measured the lungs and liver in 80 cases, 48 of which had died of phthisis. These weights and measurements are, in the tables he gives, all reduced by calculation to a common standard of height, viz., 100 centimetres (40 inches). The total volume of the lungs in phthisical subjects was found to bear to that of non-phthisical subjects the ratio of 2414.8 to 2107.5; the volume of the liver in the two classes of cases had a ratio of 1404 to 1270. The lumen of the aorta was greater in the phthisical cases than in the others in the proportion of 65 to 79, and the circumference of the bronchi in the proportion of 70.8 to 81.1. Another table gives the ratio of the circumference of the bronchi and pulmonary artery to the volume of the lungs, and of the circumference of the portal vein and of the hepatic artery to the volume of the liver. The mean results obtained were that in the phthisical cases the bronchi were $\frac{1}{2}\frac{1}{5}$ and the pulmonary artery $\frac{1}{3}\frac{1}{4}$ of the lung volume. The one measurement is linear, the other cubic; but this does not affect the comparison which the author wishes to draw. In the non-phthisical cases the fractions were $\frac{1}{2}\frac{1}{5}$ and $\frac{1}{2}\frac{1}{9}$ respectively. The mean circumference of the portal vein was $\frac{1}{3}\frac{1}{6}$ of the

volume of the liver in the phthisis cases and $\frac{1}{30}$ in the others. The hepatic artery was also relatively smaller in the phthisis cases, being $\frac{1}{6}$ in them and $\frac{1}{2}$ of the volume of the liver in the others.

Arteries.—The morbid changes in the arterial coats have recently been studied in 16 cases of phthisis by N. Sh. Ippa, of St. Petersburg.<sup>1026; 6
Apr. 13</sup> In all the cases some at least of the arteries were affected, the coronaries of the heart invariably so. The coats which were found to have undergone morbid change were the intima and the middle coat. Connective tissue was found in the intima of arteries where it does not in the normal condition exist at all, as, for example, in the brachial, femoral, and coronary arteries. The vessels presenting the most extensive morbid changes were the coronaries, and those least affected were the brachial, femoral, and more particularly the pulmonary arteries.

Stschastny<sup>319 61
No. 33; Nov. 9</sup> reports regarding the relations of tubercle bacilli to the cells made in Hueppe's laboratory in Wiesbaden. His material was the spleen and liver of the marmot, the livers of chickens and sparrows, and the tuberculous tonsils of man. The results obtained were similar to those of Metschnikoff. He finds that the migratory cells in the blood and lymph channels eat the living and virulent tubercle bacilli; that in their migrations they deposit the bacilli which they have taken up in the tissues, and thus prepare the way for the development of genuine tuberculosis or tubercular infiltration. A portion of the leucocytes, with their bacilli, are converted into epitheloid cells and giant cells containing bacilli. The reporter believes it possible that giant cells also originate in fixed connective-tissue cells. The giant cells in animals subject to tuberculosis may suffer a partial or total necrosis. The giant cells of animals not subject to tuberculosis are lasting active structures without apparent phenomena of necrosis, which, just as the physiological giant cells, strengthen the defenses of the organism as the result of a formative irritation.

Predisposition.—Predisposition in our day has come to be considered merely, or nearly, as a question of dosage. Biggs<sup>59
May 11</sup> said that there was one direct cause of tuberculosis, and only one, namely, the tubercle bacillus. That other factors had an influence could not be denied, but he believed their influence was only in diminishing tissue resistance. Without such factors as tubercular parentage, unfavorable hygienic conditions, depressed general

vitality, ordinary exposure to germs of the disease might not lead to infection, but he believed that a sufficient dosage of the tubercle bacilli would cause the disease—no matter how healthy the individual, nor how favorable his surroundings. It was only a question of the introduction of a sufficient amount of the virus.

Conformation of the Chest.—Maszkowski ⁵⁶⁹_{No. 22}; ⁴¹_{Sept. 23, 1900}; ¹_{Nov. 30} states that it is maintained by many observers that disproportion in the form of the chest is an important factor in the tendency to tuberculosis. The results of a series of investigations have not led him to coincide with the conclusions of others in this respect. He selected 275 healthy individuals, and the same number of persons suffering from various stages of pulmonary tuberculosis. These persons were subjected to close and careful comparative anatomical measurements, and from these the following conclusions were deduced:—

1. That there existed no characteristic form of the thorax in those predisposed to pulmonary tuberculosis.
2. That changes in the form and diminution in the capacity of the chest, when such took place, appeared as concomitants, and developed as the disease progressed. It was a matter for remark that the general form of the chest in some of the tuberculous patients was even more favorable, if irregularity was alleged as a predisposing cause of disease, than was found in some of the perfectly-healthy persons.

Diagnosis.—Sehrwald ³⁴_{Jan. 1, 1898}; ¹¹⁷_{Mar.} describes a new diagnostic sign called plegaphony, which is obtained by a method of auscultatory percussion. He considers the use of this means important when bronchophony, ordinarily relied upon, is absent or feeble. The method consists in percussing the larynx while the ear is applied to the chest. A pleximeter is laid upon the side of the thyroid cartilage with its front edge coinciding with the crest of the larynx, and gentle percussion is made with the finger or with a hammer. This may be done by the patient or an assistant while auscultation is being performed by the physician. If the ear is applied over the infiltrated pulmonary tissue, the percussion sound transmitted through the air in the bronchi is that of a loud, quick, clear stroke, tympanitic in character. It is called plegaphony, from the Greek, meaning a blow sound. Where there is extensive atelectasis, the sound is heard if the patient simply opens or shuts

his mouth; it is weakened over exudates, but rendered louder and more decidedly tympanic over large cavities than infiltrated tissues. In pneumothorax there is a metallic clang. It is always most intense on the side opposite the half of the larynx percussed; over healthy tissue there is only a soft, low, but distinctly clinking sound. He finds this method especially valuable in affections where an examination for the vocal fremitus or for bronchophony cannot be conducted, owing to conditions which impair the voice.

Dehio ⁴¹ _{May 16; July 25} ⁶¹ says that, contrary to the theory according to which the vesicular murmur results solely from the propagation of the tracheo-glottic murmur to the parenchyma of the lung, the vesicular murmur can be plainly distinguished on auscultation, despite the intensity of the wheezing in cases of stenosis of the larynx. Besides, on auscultating the lungs after Dehio had substituted a simple rubber tube for the trachea and larynx, he could distinctly hear a vesicular murmur which could only be attributed to a transmission of the concussion in the interior of the alveoli of the residual air by the column of inhaled air.

Gibson ³⁶ has contributed a massive article on the Cheyne-Stokes respiration. The author has met several excellent examples and has made a thorough study of the phenomena linked therewith. He criticises the theories which have been formed to explain its mode of origin.

The chairman of the New York Clinical Society ¹ _{Nov. 16} presented a man who had a physical sign which was susceptible of divers interpretations. The writer had never encountered or heard it described before. It was a distinct clicking sound, such as is often heard in incipient phthisis. This was heard with maximum intensity at the junction of the fourth rib with its corresponding costal cartilage on the right side. It was occasionally so loud as to be heard some feet from the patient. It was usually heard at the end of inspiration, but frequently during expiration or forced abduction and eversion of the arms. There was no cough, but at times lancinating pains about the chest. This, in view of the recent death of the father of the patient from tuberculosis, occasioned considerable alarm. There had been no abnormality of the rib nor cartilage. The writer was inclined to the belief that the click proceeded from the fourth costo-sternal articulation or from that of the fourth rib with the fourth costal cartilage. He felt justified

in calling attention to this case in view of the difficulty which might attend the exclusion of pulmonary tuberculosis in similar cases.

Kremianski, of Kharkoff, whose name is known in connection with the so-called aniline treatment of phthisis, published in conjunction with Tseslinski⁹ _{May 18} an article on the importance of frequent microscopical examination of the sputum, both for diagnostic and for therapeutic purposes, in cases where phthisis is or may be present. The patients examined numbered 931, and they were most of them seen in Kremianski's polyclinic or out-patient department, something like 10,000 microscopical observations having been made during the course of the last two years. In addition, very thorough physical examinations were carried out, not merely by means of the stethoscope, but with the help of the spirometer, manometer, thoracometer, thermometer, and weighing-machine. As far as possible, also, very complete notes were taken of the effects of different remedies.

Of the 931 cases, tubercle bacilli were found in 570, or in 61 per cent., including cases of the most diverse description, some having cavities, some apex consolidation, and some merely signs of bronchitis or broncho-pleuritis. Thus, of the 570 cases presenting bacilli 220, or 38 per cent., had cavities; 229, or 40 per cent., had apex consolidation; 19, or 3 per cent., had simple "bronchitis," and 5, or 0.8 per cent., had "broncho-pleuritis." A considerable number (97) of the cases were sent by medical men to have the sputum examined for the purpose of diagnosis. It was by no means uncommon to find a complete absence of bacilli in the sputum of patients presenting the clearest physical signs of phthisis consolidation, and even cavities. Of 238 patients with cavities, bacilli were absent in 18, or in 7 per cent. Of 419 cases of consolidation, bacilli were absent in 190, or in 45 per cent. Of 54 cases of "bronchitis" they were absent in only 35, or in 65 per cent. Bacilli were never found in cases of uncomplicated emphysema, *i.e.*, where there were no cavities or consolidation in addition.

With regard to the value of the tubercle bacillus as positive evidence in diagnosis, Biggs⁵⁹ _{May 11} had never seen a case in which it could be found by the microscopist when the physical signs taken with the history did not afford sufficient evidence without it. But

there were some cases in which examination of the sputum had been of some aid to him in determining whether primary tubercular pleurisy existed.

As to prognosis, if he had a case of pulmonary disease presenting signs of consolidation and excavation, with long-continued cough and purulent expectoration, and did not find tubercle bacilli in the copious expectoration, he would give a favorable prognosis; he would conclude that it was a case ordinarily known as chronic interstitial pneumonia, and that the prognosis was good. If, in the course of such a case, tubercle bacilli appeared, it would be a bad sign. Their presence would usually be accompanied by fever. Aside from that he would regard the number of bacilli as of no importance.

Detection of Tubercle Bacillus.—Billings²³ describes the latest process:—

The material should be spread in a very thin layer upon a cover-glass, by means of a needle or by placing a small amount upon one glass and then pressing another cover-glass upon the first, thus making a thin layer upon 2 cover-glasses. The thin film is then allowed to dry upon the cover glass, or the drying may be hastened by warming it over a gas-flame. Then, when dry, by passing the cover-glass quickly two or three times through the flame, the albumen usually present in the medium fixes the film upon the glass.

The cover-glass is now ready for the aniline dye. One may use any color, but aniline violet, methyl blue, or fuchsin is usually employed. Fuchsin is the most often used, because its bright red renders the bacilli more prominent to most observers; the following solution of fuchsin, Ziehl & Neelson, is a satisfactory one in every way:—

Take of Fuchsin,	1 part.
Acid carbolic,	5 parts.
Alcohol,	10 parts.
Distilled water,	100 parts.

Mix in the order given. A few drops of the staining fluid are placed upon the cover-glass, held in a forceps with the film upward over a gas or alcohol lamp, Bunsen's flame, until the solution boils or gives off steam. It is then washed in water and is ready for the process of bleaching.

For bleaching any of the mineral acids may be employed.

A 25- to 33- per-centum watery solution of hydrochloric, nitric, or sulphuric acid is used. Koch prefers nitric acid; his laboratory assistant uses sulphuric, while at Vienna hydrochloric is chiefly used. It is probably immaterial which acid is employed. The stained cover-glass is immersed in the acid solution for a moment, then in a 70-per-centum watery solution of alcohol, and finally washed in water, the immersion in acid, alcohol, and water successively being repeated until the color is almost or quite bleached. This process leaves the bacillus tuberculosis colored red while the ground substance and all other bacteria, with the two exceptions mentioned, are bleached. The mordant used enables the bacilli of tuberculosis to retain the color. Too long immersion in the acid will also overcome the action of the mordant and render the examination *nil*. The cover-glass should finally be thoroughly washed in water to remove all acid, otherwise the slight amount of acid remaining will gradually fade the color and in a few months the preparation will become worthless. The cover-glass may now be mounted on a slide in water or glycerin, or, after drying, in Canada balsam. One may, however, use a contrast color—such as methyl blue—for the groundwork. It is only necessary to float the cover-glass, with the film downward, upon a 1- or 2- per-centum watery solution of the methyl blue for five minutes. The excess of blue color is washed off with water, the cover-glass dried and mounted. The bacilli of tuberculosis will be seen stained red and other elements will be blue.

To easily detect the bacilli so prepared, one should have a microscope magnifying at least 450 diameters; however, the bacilli may be seen with a less-powerful glass. An ordinary stand and substage will do for cover-glass preparations, but an Abbe substage condenser is a decided aid to the discovery of the bacilli in cover-glass preparations, and it is absolutely necessary in examining sections.

Prognosis.—G. Hunter Mackenzie³⁶ writes as follows: “Germain Séé¹⁰²³_{p.22} says: ‘It is the bacillus which, *à priori*, should decide the lot of the patient.’ Theoretically this may be true. I am convinced, however, from numerous observations, that, so far as life is concerned, the outlook in such cases is frequently not so gloomy as the acceptance of this dictum would lead one to infer. Thus, a patient in whose expectoration I found these bacilli for the

first time nearly six years ago, while repeated examinations every year since then have continued to reveal their presence in numbers varying from about 150 to 300 ($\times 450$), has had scarcely any fever, and has markedly increased in weight during this period. The remarkable thing is that for all these years she has hardly ever felt indisposed. In another patient I found them plentiful in the expectoration five years ago. I continued to make examinations of the sputum for about three years. Bacilli were always present. Neither during that time, nor since, has the patient felt more than very slightly indisposed, and that very occasionally. In another case I found them in the sputum four years ago; the patient has had one or two attacks of what was described as 'catarrhal pneumonia' since, but is now in tolerable health. I might enumerate many similar cases which have come under my notice, but those referred to will, I think, justify us in assuming that the presence of tubercle bacilli in the sputum is not, *per se*, a grave indication so far as life and even tolerably fair health are concerned. They do not in any way decide the lot of the patient. Nor do the numbers in which these organisms are present in the sputum necessarily add to the gravity of the case. I except from this rule, however, those instances in which they are so persistently abundant as to be beyond power of enumeration, and especially when singly, or combined in twos or threes, they present comma-shaped outlines. But, speaking generally, I concur with Germain Sée when he says that 'the multiplicity of these parasites does not in any way indicate the gravity of the lesions.' There are, however, certain symptoms and collateral conditions which, plus the bacillus, may materially aid us in forecasting the lot of the patient. The most important symptoms are fever and consequent loss of body-weight. Tubercle bacilli within the organism are not necessarily productive of fever. The evening temperature in many cases ranges from 98° to 98.5° F. (36.5° to 36.9° C.), or at most to 99° F. (37.2° C.); the body-weight may increase, and all the while bacilli may be found persistently present in fair average numbers in the sputum. Whatever may be the immediate cause of the phthisical pyrexia, it is certainly not due to the mere presence of the bacilli. On the other hand, I have seen comparatively few bacilli accompanied by a marked state of fever; this is a most ominous combination—a great deal more so than many bacilli and slight or no

fever. The principal collateral condition which materially contributes toward deciding the lot of the patient is the locality of the tubercular lesions. I have already brought under your notice the cases of several individuals who have led tolerably comfortable lives for years with tubercle-bacillary sputa persistently present throughout the period of observation. In all these cases the seat of the lesions was the lungs. When the larynx or pharynx has been the locality, or one of the localities, of the lesions, the course of the case has been very different, for I have rarely witnessed a case of genuine tubercle-bacillary disease of the larynx or pharynx without its undergoing rapid deterioration. Bacilli plus laryngeal or pharyngeal lesions do decide the lot of the patient; there is no mistake about this. They may be said simply to swarm in the acute variety of laryngeal phthisis."

When one lung only is affected this condition is compatible with life for years—sometimes many years. In one case known to J. Milner Fothergill,¹³⁸ _{Apr. 15} where the patient was originally under the care of C. J. B. Williams and Hope, famous in his day as an authority on the heart, the remaining span of life extended to 40 years, death occurring from capillary bronchitis set up by a bad fog. In such cases there is often some compensatory hypertrophy of the sound lung; and the patient is said to have lived "with one lung." This is most common with well-to-do private patients who have had the means and leisure to take care of themselves.

Prophylaxis.—Villemin¹⁰ _{July 30;} ⁵⁵ _{Aug. 3} is entitled to speak first on this subject: "The cause of the disease being now known, the means for preventing it are apparent and within the power, to a certain extent, of most intelligent persons. The microbe is found in the milk, muscles, and blood of animals which are used by man as food—the rabbit, fowl, ox, and especially the cow. Raw or half-cooked meat or blood, which may contain living germs of tuberculosis, should be prohibited, and milk for the same reason should be boiled before being used. On account of the danger so manifestly attending the bottle-feeding of children, 2000 dying every year in Paris alone from tubercular disease, the attention of mothers and nurses should be drawn to the absolute necessity of boiling the milk before giving it to the child. All meat should be cooked, not on the surface only, in English fashion, but thoroughly; otherwise it is dangerous. As the germs of the malady can be

transmitted from man to man, particular precautions should be taken by the attendants on a phthisical patient. The expectoration being the most formidable agent for the transmission of the disease, care should be taken that the patient does not spit on the floor, carpet, sheets, or handkerchiefs. A spittoon is indispensable, and when found necessary to empty it its contents should be put into the fire, and not thrown outside, and the vessel cleaned with boiling water. No one should occupy the same bed with the patient, and no children ought to sleep in the same room. All curtains and other superfluous upholstering ought to be banished from the chamber, and the walls, if possible, whitewashed, and linoleum put on the floor."

Cornet²²_{Apr. 5} said the danger lay in the sputum alone, and then only when it became dried, pulverized, and caught up as dust in the air. Sputum was not easily pulverized, however, and, moreover, there were protective works for preventing the ingress of such virus in the nasal passages and in the bays and corners of the respiratory tracts, where the bacilli were caught and sent back to the outer air by the ciliated epithelium of the air-passages. The sputum was most dangerous when it was expectorated on to the ground or into a handkerchief, as it was here that the conversion of it into dust was most favored. In his numerous investigations in hospitals, polyclinics, and private dwellings, where the sputum was ejected on to the floor or into handkerchiefs, he always found virulent bacilli in the air or on the walls, whilst they were constantly absent where expectoration took place in proper vessels. It was no wonder, therefore, that those belonging to consumptive patients, and especially the children of consumptive mothers, suffered so much from the disease. As regarded prophylaxis, then, it was first of all requisite that, whether tuberculous or not, every one expectorating in a closed space should do so in a proper vessel, and phthisical patients should be taught always to expectorate in a vessel, never on the floor or in a handkerchief. Spitting-cups might be quite safely emptied into the closet, and they only require a little water at the bottom to prevent drying. In case of death the walls of the chamber should be rubbed down with freshly-baked bread, the floor washed, the bed and clothing disinfected in superheated steam. Generally speaking, it was advisable to rub down the wall with bread on any change of residence. Consump-

tive patients should be separated from others in general hospitals. By following out the principles of prophylaxis he had mentioned, he expected considerable diminution in the ravages from this fell disease.

Moore ²_{Feb. 2} suggests that some space might be lopped from the "gilded saloon" on ocean-steamers for separate compartments for consumptive travelers, and I have made a similar suggestion ⁹⁹_{Nov. 7} for railway-cars.

The New York Board of Health and the Paris Committee ⁶_{Aug. 10, 17} formulate the advice of these various suggestions for distribution among the people.

Auto-infection.—As stated already, patients not only affect others, but also themselves. Concerning relapses, Flick ⁶⁰_{May 4} says: "In these and other similar cases there was no exposure that could have accounted for the sudden change of the course of the disease. In none of the cases did the change come in extremely cold weather, and in one it came during the summer. Taking cold, moreover, would not satisfactorily account for the phenomena, as in each case there were new centres of disease, and taking cold should only have affected the old centre. Auto-infection not only gives a proper explanation of these and all similar cases, but renders intelligible many clinical facts about phthisis which are otherwise hard to understand.

"Were it not for auto-infection most cases of tuberculosis—at least, most cases in which the disease is outside the cranium—would get well. In every case which has ever come under my notice there was a decided effort on the part of nature to establish a cure, and in proportion as the victim had retained his powers of digestion and assimilation he made a good, bad, or indifferent struggle against the disease. In this very effort, however, seems to lie the danger, for by trying to resolve the tubercular deposits he is liable to start up new centres of disease."

In accordance with the principles of the prophylaxis of phthisis advanced by Cornet, Dettweiler, of Frankenstein,¹¹⁶_{May} has designed the following pocket spit-cup or flask, which will obviate the necessity of expectorating either on the floor, street, or the handkerchief. The flask holds about 3 fluidounces (90 cubic centimetres). It is made of blue glass, and is flat. There are two openings, one at the top and one at the bottom; both have metallic

screw-caps. The upper opening, which is larger, has, in addition, a spring cover or cap, which closes quite tightly; also, a polished metal funnel, which reaches half-way down into the flask. This funnel acts similarly to that of certain ink-bottles, and prevents the spilling of the contents of the flask, even if the cap is left open. The lower opening is designed to aid a thorough cleaning when necessary. The instrument can be sold at a cost of less than 50 cents, can be kept perfectly clean, closed securely, and is altogether admirably adapted to the requirements of consumptives. As it has been computed than an average case of phthisis expectorates 720 million bacilli in a day, the necessity of some such device is imperative.

"If the spittoon occupied the place in the affairs of modern life that it deserved," said Kretschmar,⁹⁹ "there would be far less danger of pulmonary consumption. Where do you find spit-boxes? Not in the streets, not in the ferry-boats, not in the street railroad-cars, not in the steam railway-cars, except in a few palace-cars. Expectoration in one's handkerchief is most dangerous. It is of the greatest importance that the rooms in

which consumptives live should have no carpets. Linoleum or oil-cloth is to be preferred."

"And so this humble utensil," says an editorial writer,⁹⁹ "which since the days of Dickens's 'American Notes' has stood as a by-word and reproach against American social usages, is at last given public recognition as an important instrument of service to the public health. Now, if the public cuspidor can be properly disinfected; better still, if it can be made of pasteboard and burned when used; best of all, if it can be used by the tuberculous as well as by the nicotinous subject, we shall welcome it with intelligence, however the æsthetic gorge may rise at it."

Treatment—Climate.—Fisk, of Colorado,⁹⁹ as a result of his observations, says that, "taking cases as they come to us, we can



DETTWEILER'S SPIT-CUP.
(Therap. Monatshefte.)

expect improvement in 2 out of 3 ; that men do better than women, as in fact they do anywhere ; that persons over 20 years of age do better than those under 20, and that those over 30 years of age do still better ; that heredity forms no bar to a person's coming to Colorado, but that the more indirect the inheritance the better are the chances ; nor should a haemorrhagic tendency debar one from coming, as such cases do admirably well ; that the chances of obtaining an arrest of trouble are improved by the patient's possessing a sound digestion, a good appetite, and a pulse and temperature not much raised above the normal ; and patients in the early stages of the disease, especially if their digestion be sound, appetite good, and pulse and temperature nearly normal, are the fittest subjects for our climate, whether they have any hereditary tendency or not."

Concerning haemorrhage, he declares that of the 44 haemorrhagic cases he finds that 26, or 59.1 per cent., were much benefited ; 7, or 15.9 per cent., were somewhat benefited ; 2, or 4.6 per cent., were made worse ; 9, or 20.4 per cent., died. That is, 75 per cent. were benefited, and 25 per cent. grew worse or died. This certainly does not uphold the idea that Colorado is not good for haemorrhagic cases ; it goes to prove, very decidedly, the direct contrary, that such cases do admirably there.

Curtin¹⁰⁰⁶ June concludes : " From the foregoing arguments we should conclude that each case should be carefully studied in all its phases before deciding upon a change of residence. On a high mountain (say from 5000 to 10,000 feet) a residence far removed from the sea-coast is best for a patient with a tendency to haemoptysis. At a location of this kind one would probably have not only a rarefied, but also a cold, dry, aseptic air,—factors which would be most beneficial. Care should be taken that the elevation of the patient should be gradual and not too rapid, otherwise the early effects of a sudden elevation might be followed by unpleasant results. A case of syphilitic phthisis will probably be benefited by sea-air, while a tubercular patient would in all probability be injured by such a residence."

Bowditch⁹ Oct. 13, '88 says : " To state briefly my present views : I believe that properly-selected altitudes possess a combination of climatic attributes which, according to our present knowledge, form the best means of cure for cases of incipient phthisis in

which there are no symptoms that would contra-indicate residence at a great height,—*e.g.*, cardiac weakness, excitability of temperament, marked feverishness, or a pronounced emphysematous condition, all of which symptoms are, according to the authorities mentioned, apt to be unfavorably affected by altitude."

Creasote.—The literature of the year is enormous. The mere citation of references would occupy the whole space allotted to the subject. Robinson,⁵ with 150 cases, declares: "I am convinced, in view of what I have seen, the proofs of which I have stated, and notwithstanding their imperfect character in many particulars, that we have in beech-wood creasote a remedy of great value in the treatment of pulmonary phthisis, particularly during the first stage. Not only does it lessen or cure cough, diminish, favorably change, and occasionally stop sputa, and relieve dyspnoea in very many instances, but it also often increases appetite, promotes nutrition, and arrests night-sweats. It does not occasion haemoptysis, and rarely causes disturbance of the stomach or bowels, except in cases in which it is given in too large doses. There is a fair amount of evidence to show that by its long-continued judicious use it may and will modify favorably the local change in pulmonary phthisis, and how it does this I have pointed out previously, as far as I was able. Whether or not it has any direct antibacillary effect when given internally, or by inhalation, or both combined, the latter method being in my judgment the most efficient one, remains as yet to be determined in a more accurate manner. It is certainly an unobjectionable medicament from any point of view."

Von Brunn,⁴ with 1700 cases, obtained the most favorable results in recent stationary cases of young people, due to a unilateral catarrh or infiltration of the apex. The gastric digestion was first improved and later the respiratory symptoms; a gradual diminution and even disappearance of bacilli was noticed; the physical signs and fever were favorably influenced. Von Brunn ordered creasote in wine or pills with opium, and inhalations.

Szendiak¹³ treated 175 cases with favorable effect in 42 per cent., especially upon the cough and expectoration. In many cases the general condition improved.

Bourget²¹⁴ says that of all the remedies recommended for the treatment of phthisis, beech-wood creasote is the only one which retains its ascendancy, although some pessimistic physicians still

reject absolutely all treatment as useless. It is evident that not much is to be attained when creasote is given in doses of only 2 to 3 drops a day, but it is otherwise when larger amounts are administered. It is necessary to make the patient take the largest dose possible, without reference to what the pharmacopœia says on the subject, only seeing that the digestive system is not seriously disturbed thereby.

Guttmann has shown that tubercle bacilli will not grow in solutions of a strength of 1 to 2000 creasote, while cultures are but feeble in a concentration of 1 to 4000. To charge the blood in the proportion of 1 to 4000 would require the ingestion of 15 grains (1 gramme) of the drug daily, an amount which this writer did not find it possible to give, though he administered 9 grains (0.6 gramme). Sommerbrodt has given 12 grains (0.8 gramme) daily inclosed in capsules. This plan Bourget condemns on the ground that the drug thus administered will produce a very active circumscribed inflammation at the point where the capsule empties its contents. Pills of creasote made up with some resin, in the usual manner, are equally objectionable, since his experience confirms that of Goetz and Gilbert, that they very generally pass through the intestine undissolved. For about three years Bourget has used, with very satisfactory results, a method of internal and external treatment which he calls the "intensive method," and which consists in saturating the system with creasote without inconveniencing the patient. For the internal treatment he prefers guaiacol dissolved in wine, or, in winter time, in cod-liver oil. The wine is given in tablespoonful doses, each containing 1 grain (0.06 gramme) of guaiacol. Little by little this is increased to 2 to 3 tablespoonfuls, until many patients take 15 grains (1.0 gramme) of guaiacol daily. In cases in which there is a disgust for the wine, or if it disagrees with the stomach, the author administers the drug by enema, in the form of an emulsion. The two forms of administration can sometimes be alternated with advantage, giving the drug by the mouth for twenty-five days, and then by the rectum for an equal time. At the same time the author employs externally a mixture of 20 parts of creasote and 200 parts of cod-liver oil. On retiring the patient's chest, back, and axillæ are rubbed with this. During the night, and when possible during the day also, an inhaler is worn, in which a few drops of creasote are placed.

Gradually the patient is, in this way, saturated with creasote in an amount sufficient to interfere considerably with the evolution of the bacilli. To obtain success the treatment must be continued without intermission for three to four months.

Kossow-Geronay⁸ _{Sept. 14} claims relief of all the symptoms with this drug, which he administers also by inhalation.

Watson⁸¹ _{Aug.} believes that while creasote will not cure all cases of consumption, yet it will benefit nearly all; that in cases with simply consolidation before the "breaking down" process begins, it seems to arrest the diseased process, and further investigation will be required to ascertain its permanent utility.

Seitz¹¹⁶ _{Jan.} finds that for tuberculosis and chronic catarrhal affections creasote is best administered when mixed with cod-liver oil, as in the following:—

R Creasote, 38 grains (2.5 grammes).
Cod-liver oil, 6½ ounces (200.0 grammes).
Saccharin, 2 grains (0.13 grammes).

M. Sig.: 1 to 4 teaspoonfuls one, two, or three times daily. For children, maller doses.

Sommerbrodt⁴¹ _{Sept. 23; Aug. 21} gives statistics of 5000 cases treated in hospital, and is convinced that creasote does more than improve the digestion, according to Klemperer, or reduce the secretions, as Cornet believes.

Brzezinski, of Plevna, ⁷⁷⁰ _{Aug. 30, '88; July 1} ²⁶ details his experience concerning the treatment of pulmonary phthisis by creasote (*creasotum e bitumine fagi*). He lays down the following propositions: 1. Creasote is a very good tonic and antiseptic means, which alleviates cough and expectoration, lowers the temperature, and, above all, improves the patient's general state. 2. To secure satisfactory results, however, it is necessary to use the remedy in large doses for a prolonged period, for many months. 3. The best results from the drug are obtained in incipient phthisis, and in cases free from fever. 4. Patients tolerate the remedy very well. Any unpleasant accessory effects are exceedingly rare, and when present depend upon the employment of an impure preparation. 5. Hæmoptysis does not contra-indicate the use of creasote. In the presence of a tendency to hæmoptysis it is useful to add iodoform. 6. The drug may be administered most conveniently in the form of pills, after Sommerbrodt's formula, which is this:—

R Creasoti bitumine fagi, gr. lxxvj (5.0 grammes).
 Balsami tolutani, f3viss (20.0 grammes).
 Excipientis amari, q. s.

Fiat pil. no. c. One pill is to be taken on the first day, 2 on the next, 3 pills daily for a week, 4 pills daily for the next week, etc., until 9 pills, 0.45 gramme (7 grains) of creasote a day are reached.

Andreesen ²¹_{v.6, p.213; Aug.} ¹¹⁶ uses the drug in parenchymatous injections, which he says are painless when made into the back, and, though the remedy does not relieve to the extent once believed, it is, nevertheless, of value.

Bourget ²¹⁴_{May 15; Sept. 14} ⁶ prefers guaiacol as being less irritating to the stomach and as being, therefore, better borne than creasote. He recommends the following prescription, substituting in winter cod-liver oil for the wine: Guaiacol, 2 drachms (7.8 grammes); tinct. quimiae, 6 drachms (23.3 grammes); vin. Malacc., 40 ounces (1244 grammes). He begins with 1 tablespoonful at every meal, gradually increasing the dose until 3 tablespoonfuls are taken. Patients have in this way taken from 22 to 30 grains (1.4 to 2 grammes) of guaiacol in the day without any trouble. Patients who could not take wine had the following enema administered: Guaiacol, 30 grains (2 grammes); ol. amygd., 5 drachms (19.4 grammes); acac. pulv., $2\frac{1}{2}$ drachms (9.7 grammes); of emuls. cui add. aqu., 40 ounces (1244 grammes); misce. Sig.: "For 4 enemata." In winter he prescribes: Guaiacol, 40 grains (2.6 grammes); ol. jec. as., 6 ounces (186 grammes); misce. Sig.: "1 tablespoonful at every meal." The patient is also rubbed with the following lotion before bed-time on the chest and back and in the axillæ: Creasoti fagi, 5 drachms (19.4 grammes); ol. jec. asell., 6 ounces (186 grammes); misce. He is then covered over with blankets. During the day, and if possible by night also, the patient inhales from 2 to 3 drops of creasote by means of a nasal respirator.

Fawitzki ⁵⁸⁶_{Nov. 48-50} has treated 18 cases of phthisis with guaiacol, in 4-drop doses, two or three times a day, given in tincture of gentian and sherry wine. He believes that guaiacol, like creasote and menthol, is not a specific in phthisis, but is rather a valuable symptomatic remedy. It seems to have an anticatarrhal action. In but one of his cases did there seem to be any real improvement in the condition of the lungs; the tubercle bacilli disappeared. Superficial lesions in the larynx healed rapidly under

local applications of a solution in oil; the deeper lesions were not affected.

Nobili ⁵⁰⁵ _{Feb. 76, 77, 78; Oct. 21; Sept.} ²⁵ ₁₂ writes a very encouraging article on the efficacy of guaiacol in tuberculosis. He says that its physiological properties are twofold: 1. It strengthens the organism. 2. It destroys the bacillus tuberculosis. He looks upon guaiacol as the sovereign remedy in this dread disease and prefers it to creasote. He has up to the present treated more than 20 cases with good effect; 12 of these were in the initial stage, the others were more or less advanced.

In general Nobili began with doses of 1 to 3 grains (0.06 to 0.19 grammme) daily after meals. It was given in wine, broth, or sweetened water. He employed the following formula:—

Guaiacol,	1 grammme (gr. xv).
Alcohol, : : : : .	200 grammes (3vj 3ij).
Tr. gentian,	25 grammes (3vj Mxv).—M.

The dose is gradually increased, so that in time the patients take from 18 to 45 grains (1.2 to 3.0 grammes) daily.

Nobili's experience has shown that guaiacol is easy to take, is without unpleasant effects, such as heartburn, vomiting, diarrhœa, increase of cough, irritation in the throat, etc. Patients who cannot take creasote on account of the vertigo, headache, nausea, vomiting, and diarrhœa that it causes can bear guaiacol very well.

Hot Air.—De Renzi ⁵⁰⁶ _{Feb.; Dec. 10, 78} ⁴¹ stated to the Italian Congress of Internal Medicine that the tubercle bacillus, being able to flourish only between restricted limits of temperature, the idea naturally occurs that its development may be prevented by raising or lowering the temperature of the inspired air above or below those limits. Worms recommends cold air; Krull ⁴ _{v. 26, p. 607} has tried inhalations of hot air. De Renzi also prefers the second, chiefly because the required temperature is more easily obtained with inhalations of hot air. The hot air is obtained from a strongly-heated spiral tube. Before reaching the mouth of the patient it passes through a tube in which is placed a thermometer indicating exactly the temperature of the hot air inhaled. In one patient inhalations at 180° C. (356° F.) caused no discomfort. The temperature he recommends as most convenient and best borne is from 140° to 160° C. (284° to 320° F.). The duration of each inhalation is from fifteen min-

utes to one hour. One patient had haemoptysis during treatment, but he had often had it before. All the patients so treated felt better and stronger, and wished to continue the treatment. In some the weight of the body increased and the quantity of the bacilli in the sputa sensibly diminished. The pace of the heart and respiration is quickened by the inspiration of hot air, and the general temperature of the body is raised, but all subside as soon as the inhalation is over.

Later, de Renzi ^{497, 169}_{No. 17; June} concludes: 1. Inhalations of air at a very high temperature (from 350° to 360° F.—176° to 182° C.) are capable of producing in many instances a marked improvement in the general condition of phthisical subjects. The permanency of these improvements is, however, extremely doubtful. 2. The influence of hot-air inhalations on the growth of the tubercle bacilli is uncertain. It is probable that the bronchial secretions are sterilized by the inhalations, but their influence upon the bacilli deeply imbedded in the pulmonary tissue is most doubtful, as the inspired air by the time it has penetrated into the deep lung-tissues becomes so cooled that any germicidal property is highly improbable. 3. Symptoms of haemoptysis having been observed to follow the use of the inhalation indicate that great caution should be used in the application of the treatment. 4. The treatment, at best, should be considered palliative or prophylactic rather than curative. Mosso and Rondelli, ^{474, 326, 69}_{V. 28, No. 3; B. 4, p. 500; p. 536} have made a number of practical tests, chiefly by experiments on animals, in order to determine the temperature of the exhaled air when it is inspired at a temperature of about 200° C. (392° F.). Their results are even less favorable to the method of treating phthisis by inhalations of hot air than those which have been thus far reported from clinical experience. Weigert's apparatus was the one employed. They inserted a thermometer into the trachea of a dog, forced it to breathe heated air, and found that directly under the larynx the temperature had already fallen from 160° to 37.8° C. (320° to 100° F.), while the rectal temperature was 39° C. (102.2° F.). The result was even more striking when the thermometer was pushed upward through the vocal cords into the pharynx, as the figures were almost identical with those obtained in the former experiment. It was also shown that the exhaled air, being saturated with moisture, is of the same temperature whether inspired

at 130° C. (266° F.), or 18° C. (64.4° F.). The results of their other experiments simply corroborated those which have been mentioned, and seem to prove conclusively that inhalations of hot air can exert no therapeutic effect. The latest contribution on this subject is by Assistant Surgeon J. J. Kinyoun, of the Marine Hospital Service,¹⁰²⁵ _{Sept. 6} who took patients that presented about the same physical signs, the diagnosis having been verified in each by examination of the sputum. Each sitting lasted an hour, the temperature of the inspired air varying from 120° to 230° C. (248° to 446° F.), though that of the expired air was only between 65° C. (149° F.) and 80° C. (176° F.). There was not more than 1 degree difference in the rectal temperature taken at the beginning and at the end of the sitting. Sometimes there was a decrease of from 5 to 10 beats in the pulse, and rarely there was an increase by so much as 20 beats. The respiration was sometimes quickened, sometimes retarded, never more than 5 respirations; sometimes there was no change. There was a slight improvement in the patients, but in all of them it seemed due to increased chest expansion. A test experiment was made with a tuberculous patient that inspired cold air; the rectal temperature, pulse, and respiration curves in the chart accompanying his history are closely comparable to those in the charts of the patients that used Weigert's apparatus, and, like them, he improved while indulging in the pulmonary gymnastics. In the last analysis of all the reported cases treated by this method, the beneficial results seem consequent upon the increased expansion of the lungs; and all the reporters agree that the air when it reaches the lungs is so moderately hot that at best the germicidal effect is limited to the bacilli in the bronchi.

Trudeau,⁹ _{Sept. 25} at the Association of American Physicians, gave his conclusions as follow: 1. The therapeutic value of hot-air inhalations in phthisis is doubtful. 2. The evidence obtained by bacteriological study of the cases recorded does not confirm the assumption that inhalations of heated air can either prevent the growth of the tubercle bacillus in the lungs of living individuals or diminish the virulence of this microbe when it has gained access to them.

Fernet,¹¹ _{July 21} at the *Société de Thérapeutique*, gave an account of his treatment of pulmonary tuberculosis by injections of *camphorated naphthol* into the lung by means of a Pravaz syringe

armed with a long needle plunged into the first or second intercostal space. The dose was 3 drops of the camphorated naphthol, of which 1 was of pure naphthol. Of 4 patients 3 were notably improved; the expectoration diminished and the physical signs were much lessened. Dujardin-Beaumetz considered that the treatment was not rational, while Gimbert said that he employed naphthol dissolved in oil in subcutaneous injections in doses of 10 drops each, and that he found the patients improve considerably under its use. Every second day he made an injection, but he considered that intra-pulmonary injections were dangerous.

Bramwell, of Edinburgh, collaborator, ⁷⁶⁶_{v.1, p. 72; Nov. 16}⁹ uses, apparently with good results in some cases, the intra-laryngeal injection of oily solution of *menthol* for phthisis. After the method of Jamieson, he employs a 10-per-cent. solution in olive-oil, of which about 20 drops are injected by introducing the curved nozzle of a syringe between the vocal cords. Three or four injections are made at each sitting and repeated daily. Bramwell believes the method is of advantage in certain cases, but how wide its range of usefulness may be he has not decided.

Philip ²_{Feb. 2} states that for eighteen months he has been administering pure *eucalyptus oil* internally in phthisis with great advantage. The preparation, "compound eucalyptus cream," was the result of experiments carried out by Messrs. Baildon for the purpose of combining the drug with cod-liver oil. The emulsion contained 5 minims to 1 drachm (0.31 to 3.7 cubic centimetres) of eucalyptus oil and 75 per cent. of cod-liver oil. It was borne well by patients who could not take other preparations of cod-liver oil. The eucalyptus oil disguised the flavor of the cod-liver oil to a remarkable degree.

Philipowicz ⁵⁸⁶_{Nos. 48, 49, '88; Jan. 6}¹¹³ has administered *thymol* to 38 patients, 17 of whom were treated exclusively with this remedy, while the remaining 21 were given the preparation after diarrhoea had set in. The results of the first group were 10 improvements and 4 deaths, while 3 remained under treatment. The results of the second group are not given, as the treatment was not a uniform one. Thymol was administered in daily doses of 45 grains (3 grammes), being given in gelatin capsules, in which medium the burning taste of the drug was less noticeable.

Schnitzler ¹³⁶_{Oct. 1; July 10}²² has for some time past been using *balsam of*

Peru in cases of pulmonary phthisis with laryngeal lesions. It may be remembered that Landerer drew attention to the efficacy of this drug some time ago, but little has been heard of it since. It may also be remembered that the drug acts differently on tuberculosis when injected directly into the veins than when given by the mouth. Schnitzler makes an emulsion of the balsam with olei amygdalarum, mucilag. gummi arabici, and sodii chloratis 1 to 400, and in this form injects about 0.5 to 1.0 gramm (7½ to 15 minims) of the drug. He advises the precaution of breaking up the oil-globules every time before use, so that their dimensions are less than the blood-corpuscles. The results he has obtained from this form of treatment in tuberculosis appear to be satisfactory.

Albert³¹ _{Apr. 16} spoke most highly of the efficacy of balsam of Peru as an application after operations for local tuberculosis. In all cases in which it was applied to the wound healing was effected by first intention and the tuberculous process was checked. In 2 cases, however, the action of the drug on the kidneys was decidedly unfavorable, producing nephritis. Albert lays great weight upon using only the pure drug; many impure articles, he says, are brought into commerce under the same name.

Hugo Weber⁴ _{Sept. 2} describes a novel way of treating consumption by *carbonic-acid gas*. This consists in administering to the patient a teaspoonful of bicarbonate of soda before meals and following it with a glass of water containing 12 drops of muriatic acid. There is generated about ½ pint (270 cubic centimetres) of CO₂, which is gradually absorbed and exhaled by the lungs. Weber reports 9 cases in some detail favorably affected by this treatment.

Goetz¹⁹⁷ _{Aug. 38; Mar. 9} ² concludes that *hydrofluoric acid* inhalations do not cure pulmonary phthisis, but still "accelerate the course of the affection toward amelioration,"—at least, in a certain proportion of cases. On the other hand, the method appears to be free from any serious inconveniences, and the patients are said to bear the inhalations very well. In only 3 out of 30 was haemoptysis observed during the hydrofluoric course, but in 3 of these it was distinctly caused by excesses, while in the third it had been present before, and certainly did not increase during the treatment. The first and most common sign of improvement was a rapid return of appetite, followed by a subjective sensation of well-being. Almost as frequently a gradual increase in weight was noticed,

some of the patients gaining as much as 10 pounds (4.5 kilogrammes) in two months and a half, 14 pounds (6.4 kilogrammes) in four months, and even 16 in two months. Night-sweats, as a rule, disappeared after five or ten sittings. Fever, however, sometimes continued even after other symptoms had been markedly relieved. Neither had the inhalations any effect on cough beyond an occasional slight increase in the severity and frequency of the paroxysms, nor had they any influence whatever on laryngitis or diarrhoea. Finally, in only 2 of those who were benefited was marked amelioration of the local physical signs found, while the bacilli remained in the sputum in every case.

Hérard ¹⁰_{Oct. 30, Nov. 6, '88; Feb. 20} is convinced that the vapor of this substance may be inhaled with impunity, and that it modifies and even destroys the virulence of the tuberculous bacillus. Jaccoud remarked that the experiments made by Grancher and Chautard coincided with his own, and proved nothing in favor of hydrofluoric acid in the treatment of tuberculosis.

Polyák, ⁵⁵⁹_{V.33, p. 65, '79} ⁶²²_{Ne. 5} ⁴¹_{Apr. 4} ⁶_{Mar. 9} of Buda-Pesth, concludes that, so far from exercising any beneficial influence on the course of the disease, the inhalation of hydrofluoric acid proved hurtful in every one of the 5 cases in which it was tried.

With regard to Kremianski's special method of treatment by *aniline*, ⁶_{Apr. 27} while it was only successful in entirely arresting the development of bacilli in about 30 cases, it produced a cessation of the ordinary symptoms of phthisis—cough, debility, fever, sweats, etc., in about 300 cases.

Ransome ⁹⁰_{May} concludes concerning *ozone*: It will be seen that of the 13 cases in all stages, most of which have been under observation for more than a year, 1 of them nearly two years, only 2 have distinctly deteriorated in the time, and 1 of these has died of laryngeal phthisis. But, on the other hand, it must be pointed out that the ozone does not appear to have acted as a direct germicide, and that the control over the disease does not seem to have been due to its direct action upon the bacillus of tubercle. Ozone has a beneficial influence upon the general health of patients, and enables the still healthy portions of the lungs to resist the noxious influence of the organisms, and even ultimately to cause it to die out of the parts already attacked.

Houzé, of Brussels, ²¹⁹_{V.3, pp. 129-133} ¹⁷_{Apr. 2} ⁶_{Mar. 9} after having tried the *tannin*

treatment on all his phthisical patients for the last year and eight months, states that it gives excellent results in all stages of the disease, and especially in the condition where cavities exist. Indeed, he has no hesitation in declaring that, of all the different kinds of treatment for phthisis which he has tried, this has given by far the most encouraging results. The dose he employs ordinarily is 15 grains (1 gramme), which quantity is taken three times a day. The changes were evidently due to the drying up of the cavities, in consequence of which the hectic present in many of the cases vanished, the patient increasing considerably in weight, and gaining strength in a remarkable manner. The percussion signs were not found to undergo so marked a change as those dependent on auscultation, but even here some improvement could be detected. No bacteriological observations were made.

Martell ⁸⁴ _{No. 2; Feb. 20} ²⁵ recommends insufflations of *calomel*. These he has tried for the last three years with the most favorable results. By his method of inhalation the medicament reaches, so he claims, the actual site of disease, and in the tissues, by the presence of chloride of sodium, is converted into sublimate in the nascent state. He uses Rabierski's spray with a larger balloon than usual, 9 centimetres ($3\frac{3}{4}$ inches) in diameter, so as to obtain more power, and a vulcanite tube with a terminal bulb or olive is also attached to it. This tube is to be placed in the mouth, far back on the tongue, and the patient is to breathe through his nose with his mouth shut. A pierced vulcanite conical cork is placed in the nostrils of the affected side, because in forced breathing the pressure of the atmosphere causes the alæ nasi to close like a valve. Martell promises to give the detailed results of his treatment shortly in another paper, and at present contents himself with saying that the chief symptoms of lung tuberculosis are influenced in the most favorable way from the commencement of this treatment.

From an experience beginning in March, 1884, and extending to the present, Hall ⁵ _{No. 2.} gives it as his opinion that we have in the different preparations of *mercury*, administered to phthisical patients in small doses, the most potent weapon with which to combat this most malignant foe of mankind, that in a majority of its victims so treated improvement may confidently be expected, and a goodly per cent. cured.

Theodore Williams, ¹⁵ _{Feb.} after experimenting with new anti-

septics, arrives at the following conclusions: 1. *Phenyl-propionic* and *phenyl-acetic acid* promote appetite, digestion, and assimilation in phthisis, and thus cause gain of weight. 2. They are well tolerated in considerable doses by patients for long periods of time. 3. Their influence on the lungs is less marked than their constitutional influence, but phenyl-acetic acid acts more beneficially on the lungs than phenyl-propionic acid, and appears to reduce cough and expectoration. 4. The use of phenyl-acetic acid appears to be more indicated in cases of tuberculization, and that of phenyl-propionic acid in excavation cases, but a larger number of observations are required to speak with certainty on this point.

Laskoff²⁴_{Feb. 24; Mar. 30}⁶⁰ has experimented with *Homeriana*, a Russian plant, under the form of an infusion, in various affections of the respiratory passages, particularly in bronchitis and tuberculosis. Out of 112 patients attacked with tuberculosis in the first stage, he obtained 90 cures; the symptoms most promptly ameliorated were the hectic fever and expectoration. At the same time auscultation and percussion denoted an amelioration in the pulmonary lesions. It would seem, then, that this plant acts directly upon the bacillus, either destroying its vitality or in rendering the pulmonary tissues inappropriate for its development. The decoction is administered in doses of 30 grammes (1 ounce) to the litre (1 quart) of water, in the twenty-four hours.

Witherle²¹⁹_{May 30} claims to have obtained good results in the treatment of phthisical patients by the internal administration of *sulphide of calcium*. He commences by giving a pill containing $\frac{1}{2}$ grain (0.03 gramme) of the sulphide every two hours, and he gradually lessens the intervals between the doses until eructations or other symptoms of gastric irritation show that the limit has been reached. In most cases patients were able to take 2 pills every hour, and their general condition in every instance appeared to improve. This is, in reality, an indirect method of introducing sulphureted hydrogen into the blood, and the principle is the same as that underlying Bergeon's treatment.

The curiosity of the year is furnished by Lanigan, of Hyde Park, Mass.,⁸⁰ who says that he has for many years held a belief in the antagonism between certain cachexias. Observing that there were inherited traits of character that were diametrically opposed by others, he set about ascertaining whether there were

not also antagonistic inherited cachexias, the presence of one of which would preclude the existence of the other. He believes that he has discovered such antagonism in the case of phthisis and rheumatism, for of a considerable number of cases of the former disease, in which inquiries were made in this direction, he was unable to discover a single instance in which phthisis and rheumatism had ever attacked the same individual simultaneously or consecutively. He had also observed that rheumatics were always blessed with healthy lungs. Thinking over this apparent antagonism of cachexias, Lanigan concluded to try the effect of turning a consumptive into a rheumatic. This was accomplished by transfusion of blood taken from a patient suffering from acute rheumatism. In one case he made two injections, each of 4 ounces (118 cubic centimetres), and in a second case a single injection of 6 ounces (177 cubic centimetres). In both instances the recipients of the blood were attacked with rheumatism within a week. In a third case, in which a single transfusion of 8 ounces (236 cubic centimetres) was made, there was a transient rise of temperature to 104° F. (40° C.), but no pain was experienced in the joints. All 3 patients improved, the temperature fell, the pulse became normal, and they increased in weight; and there is now every prospect, the author thinks, that they will continue to do well, for they are gaining strength, have a good appetite, and seem to be on the high road to recovery. There is glory enough in this discovery if the author has really established the possibility of conveying rheumatism by transfusion of blood.

Lauder Brunton ^{22 June 26; 756 July} strikes a key-note when he says the direction in which one would now look is for some substance which would undergo slow decomposition in the intestine or in the body generally, and give rise to volatile antiseptic products which would be slowly but constantly eliminated by the lungs, so that during the whole twenty-four hours the tubercle bacilli would be exposed to its action. Though a volatile substance which would be excreted by the lungs is most likely to be beneficial, yet perhaps it is not absolutely necessary that it should be volatile. A soluble substance circulating in the blood might be efficacious if it possessed a specific power to destroy the tubercle bacillus without injuring the tissues of the lung, or acting as a poison to other organs of the body. Such properties are said to be possessed by

helenine, which Korab found to destroy tubercle bacilli when kept in contact with them. This is a form of camphor which occurs along with alantic oil and alantic acid in the root of elecampane (*inula helenium*). These are all, like other forms of camphor, anti-septics, arresting putrefaction, but having in addition a special power to destroy tubercle. The experiments of Marpmann appear to show that the latter two substances may possibly be useful, as animals to which they were administered did not die when inoculated with tubercle, while others similarly inoculated and which did not receive the medicine died. They have no injurious action upon man, and, after their prolonged administration to phthisical patients, the tubercle bacilli disappeared from the sputum. In cases of phthisis where I have prescribed helenine the patients appeared to improve. It is prepared by dissolving 5 grains in 2 ounces (60.0 grammes) each of alcohol and peppermint or other aromatic water. The dose is a teaspoonful in a tablespoonful of water, to be gradually increased.

Having lately visited Goerbersdorf, Brchmer's institution for consumptives, in Austrian Bohemia, Vysokovitch ¹⁰⁰⁸ _{No. 6, p. 173; Sept. 11} has come to the conclusion that the only rational and more or less successful therapeutic method is constituted by a climatic treatment including exercise, associated with *overfeeding*, as practiced in the said locality. As to the struggle against consumption raging amongst poorer or working classes of the community good results can only be secured by a substantial improvement in the sanitary condition of the people, and by a simultaneous wide popularization of our knowledge concerning infection and effective means for its prevention.

Klemperer ¹¹⁶ _{June 27} has tried *agaric acid*, an active principle of agaricine, for very many cases of profuse sweating, in Leyden's wards. The dose given was usually $\frac{1}{6}$ grain (0.01 gramme) in pill, administered in the evening about 6 o'clock. If the action was insufficient, as many as 5 pills were given. In most cases the result was very satisfactory, even in those cases where atropine failed, and it was unaccompanied by any unpleasant symptoms.

Rosenbach ⁸ _{June 27} recommends the use of an *ice-bag* for the night-sweats of phthisis. The ice-bag is applied over the abdomen for several hours during the night. This treatment is said to be successful even in cases where atropine and salicyl are not serviceable, and its continued use is well borne by the patients.

In addition to the hypnotic properties possessed by *sulphonal*, this drug is capable, according to Böttrich, of Hagen,¹¹⁶ _{Mar.; Apr. 21} of exercising a most beneficial influence in night-sweats. It acts, he thinks, very similarly to atropine, but, unlike it, is quite free from any undesirable effects. He found this property out by accident, having prescribed 0.25 gramme (nearly 4 grains) for an old lady of 80 as a sleeping-powder. The patient had been suffering from the most profuse night-sweats, obliging her to change her clothing twice during the same night. After the first dose she asked the doctor whether he had not put something into the powder to prevent the sweats. On making further observations, Böttrich was able to convince himself that as a rule 0.5 gramme ($7\frac{1}{2}$ grains) of sulphonal will stop night-sweats. Its effects seem fortunately to be somewhat permanent, as even after the drug has been stopped the night-sweats are found to be much less severe than they were previous to taking it. I have confirmed this observation in a number of cases.

Sézary and Aune²¹¹ _{Aug. 20, '88; Mar. 2} recommend *lactic acid*, 2, 6, or 8 grammes (30, 90, 120 grains) in twenty-four hours, in the treatment of diarrhoea of phthisis. They report 9 successful cases.

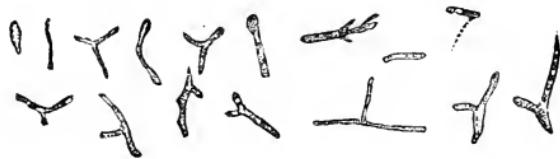
Polyák, of Görbersdorf,⁵⁵⁹ _{No. 51, '88; Apr.} gives the results of some trials he has made of 2 recently-suggested remedies in the diarrhoea of phthisis, viz., silicate of magnesia in the form of talc, which has been recommended by Debove, and lactic acid, recommended by Sézary and Aune. About 8 ounces (248 grammes) of talc were well shaken up in a pint of milk, and this or even a larger quantity was given daily. As a rule it arrested the diarrhoea after having been used for a couple of days, but if it was left off the diarrhoea returned. Laetic acid proved in his hands a much more satisfactory remedy. The initial dose employed was 30 grains (2 grammes) per diem in 4 ounces of water (118 cubic centimetres); this was increased subsequently, but not more than 75 grains (5 grammes) per diem were given. On the third day the diarrhoea and the pain were generally arrested, and during the next day or two the stools assumed their ordinary character. It was found advisable to continue to give small doses for some time longer. The patients bore the treatment well; it produced no diminution of appetite, and, unless continued for a long time, gave rise to no disagreeable symptoms. Polyák thinks it possible that even ulcers of the intestines may be healed by this means.

Dujardin-Beaumetz ⁶⁷ _{May 15, 760} is forced to tell us that we must fall back on *overalimentation* and *hygiene*. "Do not trouble these patients' stomachs, at the same time try to feed them up; give them milk, fatty substances, as much as you can, such as oil, goose-grease, butter, cream, soups with flour and grains; but, while recommending a little good wine, do not allow the stomach to become enfeebled by alcohol. After alimentation, in importance, comes climate. Oxygenation is the great point, and as much open air as possible, no matter where it is, but best where the temperature is not over 12° to 15° C. (60° F.) in winter. In a word, we have to confess that we are reduced to alimentation and respiration of pure air in this disease."

"The problem of affecting the germ of tubercle by either general or local medicinal agents," says Hunter Mackenzie, ³⁶ "has not yet been solved. The character of this organism has been fully and, I am afraid, accurately described by Filleau and Léon Petit, as follows: 'The bacillus of tubercle is, of all micro-organisms, one of the most refractory to the action of the most destructive agencies. It maintains its virulence after lying for forty days in putrid sputum, and for one hundred and eighty-six days away from contact with air. It can live at temperatures between 30° and 40° C. (86° and 104° F.). The most unfavorable conditions, though affecting its activity, do not compromise its existence, for it resumes its virulence whenever its surroundings become suitable. To render it inactive, it is necessary to have recourse to violent means, such as ebullition, steaming, or prolonged contact with antiseptic substances, such as ammonia, concentrated salicylic acid, absolute alcohol, or a strong solution of carbolic acid. Corrosive sublimate itself is powerless to disinfect the sputum. The bacillus acclimatizes itself amid the most unfavorable surroundings. It complies with the exigencies of its condition, and even alters its shape, but without losing any of its virulence, of which it gives ample evidence whenever fortune favors it. Its polymorphism is not the least curious point in the life-history of this organism. Thus, it is sometimes a short rod, sometimes a line; occasionally it splits and forms spores, but it always returns to the bacillus in its complete form with its virulence intact whenever circumstances become favorable. It knows how to suffer, but it never loses sight of its claims.'" In view of the

foregoing facts, he concludes by declaring himself a "skeptic in regard to the curability, by medicinal agents, of tubercular lesions, *i.e.*, lesions due to the bacilli of tubercle, and in which their presence can be demonstrated. (This assertion does not, of course, embrace what are essentially surgical measures, such as scraping, galvano- or thermo- cauterizations, and tracheotomy.) Antiseptics in bacillieidary strength as regards concentration and period of application cannot be borne by man, and what result can be expected from the application of a few grains of a powder, the intermittent use of a spray, or a short residence in a southern clime or on an Alpine height in the case of an organism which is not only extremely tenacious of life, but, when unfavorably suited for growth, is always prepared to bide its time, and bud and blossom afresh whenever it returns to favorable conditions?"

On the other hand, Dixon⁹ hopes to establish *tolerance* by



UNRECOGNIZED FORM OF BACILLI.
(*Medical News.*)

changes in the soil. In considering a means for overcoming infection by tuberculosis it is probable that a condition of tolerance to the action of the tubercular bacillus must first be established. To this end two hypotheses may be suggested: 1. It is possible that, by a thorough filtering out of bacilli from tubercular material, a filtrate might be obtained and attenuated so that by systematic *inoculations* a change might be produced in living animal tissues that would enable them to resist virulent tubercle bacilli. 2. To bring about a chemical or physical change in tissues that would resist tubercular phthisis, it is possible that inoculations with the bacillus would have to be made; yet, before this could be done, the power of the virulent bacilli would have to be diminished, otherwise the result would be disastrous. The accompanying cut represents tubercle bacilli in other forms than those heretofore recognized, and it is possible that they represent the condition of bacilli necessary to prove the truth of the second

hypothesis, particularly as animals inoculated with these organisms have survived subsequent inoculations with virulent tubercle bacilli.

Daremberg¹⁴ p.1827; Nov. 9 has made a series of experiments on the lower animals which inspire him with the hope of eventually obtaining a prophylactic *vaccine* for tuberculosis. He observed, during his researches, that oil or fatty substance given to the animals under experiment enables them to resist the tubercular infection when the virus is inoculated under the skin; glycogen had the opposite effect. The evolution of tuberculosis can in some animals be rendered slower by gradually accustoming them to the influence of tubercular virus, inoculating under the skin a small quantity of sterile tuberculosis cultivations before inoculating the deadly one; the spinal medulla of an animal dead of phthisis being removed and reduced to a pulp, and used for inoculation, has also this effect. Daremberg concludes from these researches that tubercular virus can be treated like mineral or organic poison; it can be increased or decreased; also that the animal economy can be protected more or less against the action of tubercular virus. With these data acquired he foresees the day when we will transform tubercular virus into tubercular vaccine.

Sansom⁶ Apr. 6 was disposed to think that the bacillus of tubercle had a tendency to die out, like other germs, if it could be put into unfavorable circumstances. Analyzing about 20 cases in which, from careful observation, he was satisfied of the arrest of phthisis, he found that the most invariable condition to be noticed was that they had all had climatic change, not in any given place or climate, but somewhere out of the air of crowds and towns. He attached more importance to this element in treatment than to any merely medicinal measures. We cannot do better, he continues, than reproduce here the words of Bennet: "The careful dissections of morbid anatomists have recently shown that this arrest of the further deposit of tubercle, instead of being a rare or occasional occurrence, really happens with extreme frequency. In 1845 I made a series of observations with reference to the cretaceous masses and puckerings so frequently observed at the apices of the lungs in persons advanced in life. The conclusion arrived at was that the spontaneous arrest of tubercle in its early stage occurred in the proportion of from one-third to one-half of all the individuals who

die after the age of 40. The observations of Rogée and Boudet, made at the Salpêtrière and Bicêtre Hospitals in Paris amongst individuals generally above the age of 70, showed the proportion in such persons to be respectively one-half and four-fifths." The observations of Heitler in the post-mortem rooms of Vienna are to the same effect, and show a large proportion of spontaneous recoveries.

Finally, von Ziemssen, of Munich,¹⁰⁰⁷ _{v.4,p.431; Sept. 14}⁶ has recently published his observations and reflections on the decrease of tuberculosis in that city. He declares that the number of deaths from tuberculosis has diminished one-fourth during the last twenty-one years, and one-third during the last eighteen years. Ziemssen hesitates to attribute this comparatively happy state of things to the cleansing of the soil alone. Nor can the protection which the boiling of the milk of tuberculous cows (much more usual now than formerly) affords against the schizomycetes be regarded as the sole reason of the improvement, for Bollinger's most recent investigations have proved that the virus of the milk of a few such cows is counteracted by being mixed with that of many healthy ones. Von Ziemssen thinks that the improvement is due not only to the cleansing and drying of the soil on which the city stands, and to the supply of pure water, but also to the better construction of the houses, especially of the schools, the widening of the streets, and the laying out of large, open spaces, plentifully planted with flowers, shrubs, and trees.

HÆMOPTYSIS.

Etiology.—Osler⁶² _{Jan. 1} reports a peculiar causative factor of haemorrhage. It was an aneurismal tumor growing from the ascending arch into the right pleura and compressing the lung. This resulted in destruction of the pulmonary tissue and a condition favoring haemorrhage from this source. There is another rare cause of haemorrhage in aneurism which may be mentioned. It is from the swollen soft mucosa when the aneurism compresses but does not erode the windpipe. In such instances the patient may have bloody sputa for some weeks, but profuse haemorrhage from this source is of rare occurrence.

Pathology.—Cotter² _{Feb. 16} exhibited before the Cork Medical and Surgical Society the heart and lungs of a man who had died sud-

denly of profuse haemoptysis. Large cavities existed in the apices of both lungs, one of which, on the left side, was filled with clotted blood, forming a regular mold of the cavity. The posterior portion of both lungs contained a considerable quantity of blood, which had been sucked in during inspiratory efforts. The belief was expressed that in these cases death usually resulted from suffocation, not from the amount of blood lost, as the patient is unable to expel the blood from the bronchial tubes.

Treatment.—Waugh⁶² finds three indications to be met in bronchial haemorrhage. Lessen blood-pressure, strengthen vessel-walls, and enrich the blood. Persons subject to this trouble should be placed on a dry diet. Lactophosphate of lime is the best preparation for strengthening the vessel-walls, and as this is slow of absorption 10 grains (.65 grammes) should be put in a glass of water and sips taken a number of times each day, so that 10 grains are taken every twenty-four hours. The vessel-walls will then stand iron or some other enriching substance, whereas before their weakness would render such a course most dangerous. Nothing is better for the haemorrhage itself than a full dose of digitalis.

Koeniger¹¹⁶ _{Nov. 28, Feb. 15}⁸⁰ has been employing almost exclusively for three years the fluid extracts of *hamamelis Virginica* and *hydrastis Canadensis*. While he does not claim that these drugs arrest all pulmonary haemorrhages and that severe haemorrhage is not invariably influenced by them, yet in by far the majority of cases their action is undoubtedly favorable even after other means have failed. The administration of the drugs before the expected onset has proven preventive where the haemorrhages are periodic. These medicines prove an excellent stomach tonic. When the cough is severe he administers 2 grains (0.13 grammes) of Dover's powder, and this, together with 20 to 30 drops of the fluid extract, is usually sufficient to arrest the haemorrhage.

Tullio⁵⁸⁹ _{May, May 18, May 20}^{2 25} states that he has obtained excellent results, in 3 cases of pulmonary haemorrhage, from inhalations of cold air. He uses an apparatus which is essentially a metal box, through which several tubes communicating with the outer air at one end open into a receptacle which communicates with a larger tube issuing from the other end of the box. This tube is closed with a mouth-piece for the patient, and has an opening, closed with a

cork when not in use, on its upper part. Through this opening the temperature of the air can be tested with a thermometer. The box is filled with snow, or salt, or with ice, so that the tubes running through it are completely covered. Air is blown into the tubes with bellows, provided with the necessary number of nozzles, and this is cooled in passing through the box to a temperature of 0° C. (32° F.), and this is then inhaled through the mouth-piece by the patient. In the 3 cases related haemoptysis was checked at once, after all astringents had failed. His claims for the method are: It is simple, effectual, and dispenses with drugs which are not always at hand, and the frequent use of which is attended by many drawbacks.

Walker⁹ _{Aug. 24} considers hygienic measures adequate in most cases of haemoptysis occurring early in chronic pulmonary disease. These play a most important part in the treatment, even of grave cases. In the ordinary attacks the addition of an opiate in sufficient doses to quiet unnecessary cough is all that is required. For severe cases we should administer either the peculiar haemostatics, turpentine, erigeron, tincture laricis, or others of this class, or the astringents, preferably gallic acid or acetate of lead, by the stomach, if possible. Alum and turpentine admit of perfect solution in atomized fluids and can be used as topical applications. Forced inspirations, so as to inhale more of the medicine, should be guarded against, lest this very effort should increase the haemorrhage. If the haemorrhage is serious from its excess or its persistence, ergot should be freely administered by the stomach, if possible; hypodermatically, if rapidity of action be imperative. In most, if not all cases, haemoptysis should be considered due to bacillary invasion, and efforts to lessen the vulnerability of the patient should be made and followed persistently.

Stirling²⁸⁵ _{Nov. 15, '88} controlled severe and oft-repeated haemorrhages in a patient by injecting under the skin $\frac{1}{50}$ grain (.0004 gramme) atropine, as recommended by Hansemann. The cough and a slightly blood-tinged expectoration continued, but the haemorrhage was at once checked; an injection of $\frac{1}{60}$ grain (.0006 gramme) and occasionally $\frac{1}{50}$ grain (.0004 gramme) was repeated at intervals of six to eight hours. Thinking the arrest might have been accidental, the injection was omitted the next day for twelve hours, with the result of a fresh and severe attack. The treatment was

then continued for a week, and all other drugs dispensed with, and the patient fed on beef-tea and hot soups. The author attributes the good effects of the atropine to its controlling influence on the blood-pressure. The patient made a good recovery and resumed his occupation. This remedy was a *dernier ressort*, and death from suffocation was imminent. The man's employment was in a damp, moist atmosphere hence, the haemorrhage was supposed to be passive or capillary. The power of the alkaloid atropine to contract the capillaries is a perfectly-established fact in physiological therapeutics. Christopher, ⁵⁷ _{Mar. 17} of Constantinople, also makes similarly favorable reports.

DYSPNŒA.

Prausnitz, ³⁴ _{Aug. 27} in experimenting on dogs, found that the giving off of nitrogen is somewhat increased; only slightly, however, as the maximum is 1.5 grammes (23 grains). The small amount of albumen found in dyspnœa results from the increase of nitrogenous substances.

Katzenbach ⁵⁹ _{Dec. 29, 78} discusses dyspeptic dyspnœa at length, and reports a case. He says it is characterized by a sense of weight or oppression across the chest, and an almost constant desire to draw a long breath, with a feeling that the air does not enter the lungs to a sufficient depth. Repeated inspiratory efforts are made; it is not aggravated by active bodily exercise. Dyspeptic dyspnœa occurs after meals, in the intervals of stomach digestion, and not infrequently at night. There is an alarming form of dyspeptic dyspnœa which only attacks at night. The only symptoms obtainable relate to the digestive organs. Dyspeptic dyspnœa, in its ordinary and mild form, is to be distinguished from that of anaemia or chlorosis and hysteria. The more severe and nocturnal form is to be differentiated from that of uremia. The majority of cases readily yield to treatment directed to the dyspepsia. If the patient has recently taken food the stomach should be evacuated.

Winner ¹¹² _{Apr. July} reports a case of hydrothorax, urgent dyspnœa, and death, apropos of the discussion in the Philadelphia Pathological Society.

Waugh, ⁶² _{Mar. 9} for the dyspnœa of chronic pneumonia, recommended eserine and syrup of wild cherry. He would avoid opium as long as possible, for with this class of patients the disease is aggravated by the drug.

GANGRENE OF THE LUNGS.

Malagola⁵⁹⁶ _{May 25, July 21} reports the case of a patient who was admitted with intermittent fever, symptoms of gangrene of the lung intervening. Intra-pulmonary injections of various antiseptics were tried. The condition of the patient daily became worse, and a drainage-tube was introduced. An incision was made in the intercostal space immediately under the right nipple. The drainage-tube, 2 millimetres ($\frac{1}{2}$ inch) in diameter, was inserted for 5 centimetres (2 inches), and every three hours was washed out with a 5-per-cent. solution of carbolic acid. As this caused violent cough and vomiting the sublimate solution, 0.5 in 1000, was substituted. This was well borne and caused but little cough. All the severe respiratory and circulatory phenomena diminished rapidly, and the general health of the patient immediately improved. After the fourth day the drainage-tube showed a tendency to be expelled. It was gradually shortened and finally taken out on the nineteenth day. The patient was admitted June 25 and left the hospital quite well September 15. There was a distinct falling in of the wall of the chest on the operated side between the clavicle and nipple.

Squire⁶ _{19, 20} had a case in which, besides the characteristic intense odor of the expectoration, there were the signs of consolidation, followed by the formation of a cavity in the seventh and eighth intercostal spaces on the right side, just within the lower angle of the scapula. The points in the treatment which merit special mention were the use of a respirator with carbolic acid and the free ventilation of the room. An oronasal respirator was constantly worn and cups of carbolic acid were placed about the room. He invariably uses carbolic respirators when the expectoration is foul, and the relief to the patient is as marked as to his companions. He was kept on brandy, a liquid diet, and a tonic mixture containing quinine. The patient recovered.

PNEUMONIA.

Roger and Gaume⁹² _{Apr. May} have written a long article on the toxicity of the urine in pneumonia. They refer to the experiments of different writers, which show that the urine of persons in a normal state of health is poisonous to animals when injected into their veins. They experimented with the urine of 11 cases of

pneumonia, with the object of determining whether there was any change in the toxicity in this disease. A person in a state of health eliminates three or four more times as much poison as one suffering from pneumonia. At the moment of defervescence the urinary toxicity suddenly increases and attains or surpasses the normal rate. The urotoxic discharge characterizes the urinary crisis and is the only constant phenomenon. It lasts twenty-four to forty-eight hours and attains its maximum on the day of the thermic crisis, or more rarely the following day. After the defervescence the urine again becomes but little toxic, descending suddenly or gradually to the normal. Physiological analysis reveals the toxicity of the urine, at the time of the crisis, to depend upon different poisons, little known from a chemical point of view.

Schütz⁶ _{Oct. 19} under orders from the Prussian government, has been experimenting on cattle, by inoculating them with warm lymph from the lungs of cattle suffering from inflammation of the lungs. He found such inoculation afforded immunity from the infectious inflammation.

Netter⁷³ _{Mar. 16} relates the case of a woman who gave birth to a child when she was very ill with acute pneumonia. The child lived five days, and at the post-mortem examination pneumonia at the apex of the right lung was found, with double pleurisy, suppurative pericarditis, and cerebro-spinal meningitis. A microscopic examination showed pneumococci. The rarity of pneumonia at this age supports the conclusion that in this case it was due to infection from the mother. A similar infection of the fetus has been found in rabbits, guinea-pigs, and mice. The pneumococci sometimes seem to produce pneumonia in the mother and pericarditis in the child, or suppurative meningitis in the mother and pneumonia in the child. Netter has only found 3 cases of this pneumonic infection in women.

Spleno-pneumonia is reported by Dauchez,¹⁵² _{Dec. 27, 78} Deville,⁸² _{Oct. 5} and Chéron.¹⁷ _{July 30} The cases were characterized by the following symptoms: Flatness, considerable diminution of vesicular murmur, soft blowing, broncho-egophony. To these may be added, fine crepitations limited to inspirations, preservation of Traube's space, and the progressive increase of vesicular murmur from base to summit as recovery advances.

Stephan⁹² _{Jad. June 5} reports 2 cases of paralysis occurring in the

course of pneumonia. He gives the details of many others collected from the literature of the subject, and discusses the opinions of various writers. He says paralysis may occur at the beginning of pneumonia, during its course, or in convalescence. The cause of these paralyses is in some cases a meningitis, but in many others there is an entire absence of gross organic lesion.

The mortality of acute lobar pneumonia is the subject of a study by Townsend and Coolidge,⁹ using as their material the 1000 cases treated in the Massachusetts General Hospital from 1822 to 1889. The average mortality was 25 per cent. This gradually increased from 10 per cent. in the first decade to 28 per cent. at the present. This increase is shown to be deceptive for several reasons: The average age of the patients has been increasing from the first to the last decade. The relative number of delicate and complicated cases has increased, as has also the relative number of foreigners. These causes they consider sufficient to occasion the entire rise in mortality. The treatment, which was heroic before 1850, transitional between 1850-1860, and expectant and sustaining since the latter date, has not, therefore, influenced the mortality rate, the duration of the disease, or its convalescence.

Etiology.—Mosler⁶⁹ _{Nos. 13, 14; Sept. 25} ²² reports a number of interesting instances of the spread of pneumonia from one person to another by infection. On one occasion four persons were attacked by the disease in one family. The father was first taken sick, and died on the fifth day. On the day of his death his wife was attacked, and also died on the fifth day. The son next became ill, and died the twelfth day. Seven days later the daughter was taken with the same disease, but recovered after a tedious convalescence. The autopsy on the son showed double fibrinous pneumonia with recent fibrinous haemorrhagic pleurisy. The autopsy was performed thirty-six hours after death, consequently the micro-organisms were too numerous to permit a satisfactory conclusion. A hypodermic needle was inserted into the daughter's lung. From the fluid withdrawn, a species of bacterium was obtained, having marked and distinguishing features, and clearly belonging to the group of bacteria of rabbit septicaemia, fowl cholera, and allied diseases. Thus, it was different from Fränkel's lancet-shaped coccus and the so-called pneumococcus of Friedländer. He thinks these cases demonstrate the necessity for the removal and disinfection of the sputum.

Bard ²¹¹ _{Jan. 13; Mar.} ¹⁵ relates the story of a severe epidemic of measles in a village in the south of France, and finds all, or nearly all, the fatal cases arose from infection from a single case. This was not only measles, but also broncho-pneumonia.

Vernon ⁵⁹ _{June 1} considers the burning of natural gas an important factor in the causation of broncho-pneumonia in children.

Porter ⁶⁰ _{Apr. 6} considers catarrhal-pneumonia influenced to a large extent by temperature changes. The extremes of cold are not favorable to the development of acute pneumonia.

The statement of Maragliano, ⁴¹ _{Feb. 11} that pneumonia is an infectious disease, is, according to Porter's views, ⁸² _{Feb. 23} an extreme position, yet the fact remains undisputed that there is a micrococcus peculiar to pneumonia.

Ballard, ⁹⁰ _{June} after a prolonged investigation into a specific pleuro-pneumonic fever, which occurred in Middleborough, England, decided that it was a specific febrile disease, which must be regarded as infectious, in the sense of being communicable from the sick to the healthy. This resulted from direct relation of individuals, and also through the medium of emanations from sewers, drains, etc., which had received sputa or other excreta of the sick, or become infected in other ways. Three cases of a specific pleuro-pneumonic fever have also been reported by Neal. ² _{Sept. 14} Crouignneau ¹⁴ _{p. 665; July 20} ⁷⁶⁰ relates a case where a lady contracted pneumonia, and died in eight days. A few days later her brother-in-law was down with pneumonia in the same house, and died also in eight days. He thought isolation wise, especially of aged persons and those addicted to alcohol.

Wells ⁶¹ _{Feb. 9, 23; Mar. 30} ¹ writes an extensive article on pneumonic fever, containing a great amount of data and 862 references. He says as to the causation: "There can be no doubt as to pneumonic fever, epidemic as well as sporadic, everywhere and always being due to the action of a single, peculiar, and specific morbific material." Baker takes issue with him and cites his own tables, as also those of Wells, to prove that it is absolutely controlled by atmospheric temperature or by conditions associated therewith.

Sternberg, ⁶ _{Feb. 23; Mar. 2, 9; Feb. 10} ¹ after investigation as to the cause of pneumonia, decides that it is evidently a specific infectious disease, the micro-organism of which is widely distributed. The development of an attack depends rather upon secondary predisposing and

exciting causes than upon the accidental introduction of the specific agent.

Seibert¹ _{May 25} is satisfied that Fränkel's *coccus*, described by Sternberg as *micrococcus Pasteuri*, would probably cause the more frequent form of pneumonia, the sthenic variety. The asthenic, bilious, or typhoid form, on the other hand, is usually produced by the *pneumococcus* of Friedländer. In his opinion the most important investigations concerning the germ theory of pneumonia were those of Rudolph Emmerich¹ _{May 25} in the State prison of Amber. The main point in the present status of our knowledge is the consideration of fibrinous pneumonia as an infectious disease, the germs of which thrive and multiply in the filth and dirt of dwellings, and we should do in internal medicine as the surgeon has long since done in operative surgery,—prevent infection by cleanliness and antiseptics. Delafield¹ _{May 25} regards pneumonia as an infectious inflammation requiring three factors,—a pathogenetic bacterium, some exciting cause for the inflammation, and susceptibility. At different times and places some one of these three factors take precedence. Slosse²⁷⁶ _{Apr. 20} considers it a general, not a local, malady. The localization shows itself late and can occur either in the lungs, the meninges, or in the endocardium. It is infectious and contagious. The cause of the disease is the *pneumococcus*.

Complications.—Hirsch⁴ _{Dec. 24, '88; Feb. 16} ³⁹ says that the proportion of cases of rheumatism complicated with pneumonia is usually estimated at far too low a figure, as the involvement of the lungs is frequently overlooked.

Pignatari⁵⁸⁹ _{Jan. 17; Mar. 23} ² recently described a form of pneumonia due to malaria. It occurs in marshy districts from July to October, and in persons already weakened by previous malaria. The distinctive clinical feature is the temperature, which reaches the highest point in the morning and its lowest in the evening. The fever may disappear, then return again. It is almost always fatal unless treated with quinine.

Von Szontagh³⁶⁶ _{B. 28, H. 2; May 29} ²⁰ reports a case of white syphilitic pneumonia in a child 5 years old, which was proven on autopsy.

Prudden and Northrup⁵ _{June} have examined morphologically and by cultures the lungs of 17 children who died of diphtheria complicated by pneumonia. The pseudomembranes in all but one of these cases were shown to contain a streptococcus which was appar-

ently the cause of the diphtheria. In all but one of the cases of pneumonia the lungs contained a similar streptococcus. They were able to induce in rabbits, with the greatest uniformity, a lobular and broncho-pneumonia by the intra-tracheal injections of pure cultures of the streptococcus, isolated from the children's lungs. They arrived at the conclusion that the acute lobular and broncho-pneumonia, which is apt to complicate diphtheria in the upper air-passages in children, is a form of inspiration pneumonia, induced by the streptococcus diphtheriae, which finds access to the lungs from the foci of diphtheritic inflammation in the air-passages.

Treatment.—Kreider⁵⁹ favors baths only in those cases which are not progressing favorably, as they exceed anything in giving relief to all bad symptoms. Difficulty of respiration and lack of secretion should lead to the employment of the baths, regardless of the height of the mercury. The bath treatment is capable of shortening the duration of the disease and convalescence and of reducing the mortality.

H. G. Beyer, of the United States Navy, ⁹ June 16, has had some experience with antipyrin in pneumonia, which, although not extensive enough to prove anything, yet is extremely suggestive. In his opinion, antipyrin is especially indicated in that stage of the pneumonic process during which there is great interference with the circulation, on account of its power of not only stimulating the heart, but also of dilating the vessels at the same time. Lees² Oct. 20; Nov. 2 has found that a very great improvement followed the use of the ice-bag in the great majority of cases. The reduction of the temperature was from three to four degrees, and usually occurred at once. In some slight cases and in 2 of broncho-pneumonia in children the disease seemed to be promptly cut short. Goodhardt² Oct. 26 has for eighteen months used no other application than the ice-bag in acute pneumonia. In 8 out of the 18 cases reported a good result followed, the temperature falling promptly and convalescence being rapidly established. Collapse might occur, but was easily detected and overcome by brandy and warmth. Fieandt⁶ Aug. 10 treated 106 cases with ice. Though 10 cases were double, only 3 out of the whole number died, and the epidemic was not a mild one. The method of application was to use an India-rubber bag filled with ice continuously over the affected lung from twelve to twenty-four hours after the crisis.

Pieragnoli³⁷⁶ _{June 16⁹} pleads for the use of calomel, which he gives combined with opium, avoiding expectorants. The course of the pneumonia is milder, the infiltrations less firm, and the extension of the same more limited. Green⁷⁷¹ _{Aug} has found much benefit from peroxide of hydrogen, a half-teaspoonful well diluted in water every hour. Clemens²⁹⁷ _{No. 21; June 9²²} reports 42 cases of the severe form of pneumonia, which were treated exclusively with inhalations of chloroform. These inhalations not only alleviate all pain, but shorten the duration of the disease. The chloroform is diluted with alcohol.

Tordeus,²¹⁹ _{May 24, '88} in cases of broncho-pneumonia in children, advises emetics, ipecac, or, better still, apomorphia, 1 to 2 centigrammes ($\frac{1}{6}$ to $\frac{1}{3}$ grain) per day. He envelops the thorax of his patients in cold or tepid compresses, which constitute an excellent derivative, cause deep inspirations, and act favorably by vaporizing the atmosphere.

Petresco¹¹ _{Aug 28; Oct 20²⁵} since 1883 has treated all cases of pneumonia with large doses of digitalis, and has had eminently satisfactory results, the attack usually aborting by the second or third day, and the physical signs disappearing altogether generally at the end of the third. In some cases twenty-four hours have sufficed to enable the patient to return to work.

Nilsson³⁷¹ _{B.19, No. 26; May} ¹⁴⁷ has used iodide of potassium in 15-grain (1 gramme) doses every three hours, day and night, with a mortality of 5.17 per cent., from one-half to one-third his former death-rate. The good effect of this remedy is doubtless due in some degree to the influence which syphilis exerts on the infectious diseases.

BRONCHITIS.

Etiology.—Grant² _{Feb. 2} furnishes a case illustrating the relation existing between gout and bronchitis. On several occasions he had been called to see a man suffering from tenderness in the epigastric region, nausea, marked flatulence with eructations, severe dyspnoea, and the physical signs of acute bronchitis. The urine was loaded with urates and great prostration was present. A typical gouty inflammation of the great toe supervened, and simultaneously the other symptoms subsided. West¹⁵ _{Aug.} found plastic bronchitis to occur frequently after pneumonia, and in many cases to be associated with grave skin affections. There

seemed in one case, also, to be a relation between the formation of casts and the catamenia.

Pathology.—Picchini⁴⁷⁴ _{v.1, p.165; Oct.} ¹³ describes the process in 2 cases of bronchitis fibrino-hæmorrhagica which came under his observation. First, a hæmorrhage took place in the lumen of the bronchus and a coagulum formed. Around this little hæmorrhages occurred; the epithelium of the mucosa disappeared, and a small-celled infiltration of the bronchial walls followed; the submucous vessels enlarged, and a hæmorrhagic extravasation exuded from them into the surrounding connective tissue. By this means the bundles of connective tissue were separated; at last there appeared a periglandular small-celled infiltration. The micro-organisms consisted of three different kinds, and possessed great vitality, but soon lost their pathological strength. Stirling,¹⁵ _{June} in his case of plastic bronchitis, found the casts, which were expelled in great numbers, to be white and but a few stained with blood. The majority measured from 3 to 4 inches (7 to 10 centimetres), some as much as 6 inches (15 centimetres), in length. As in other cases, most of these come from the small and medium-sized bronchi, but in some instances the main branches represent tubes of large size, as it is not at all infrequent to find a diameter of almost $\frac{1}{2}$ inch (12 millimetres), and fragments even thicker have occurred. They divide dichotomously, and are of such firm consistency as to bear frequent handling with little injury. The majority are solid, some are hollow. They have evidently been deposited in successive layers, and consist of concentric laminae which can be separated when dry. From this formation it is reasoned by this author that a considerable amount of the exudation takes place in the larger bronchi and is drawn into the smaller by efforts of inspiration. As regards chemical composition, they consist of coagulated albumen soluble in alkalies. Under the microscope they showed fibrillar material, in the meshes of which are numerous leucocytes and fat-globules, some hæmocytes, and epithelial cells. Octahedral crystals, said to be similar to those found in bronchitic asthma, have been observed by others, but he had not been able to find the spirals seen by Curschmann. Caussade⁷ _{May 10} reports one of the most remarkable cases of pseudomembranous bronchitis which has a place in medical literature. He found, with the aid of chemistry, a special nature of the fibrinous blocks which has

hitherto been undescribed, viz., that the syntonine enters into the fibrinous blocks. Histology revealed a structure in these blocks of membrane analogous to the coagulations of aneurisms. Eklund, of Stockholm, corresponding editor, ¹⁰²⁸ _{v.24, '88} reports a case of bronchitis fibrinosa in which the patient first had haemoptysis, then a heavy sensation in the chest, and later succeeded in expectorating some casts with blood. These casts were of a grayish color, were somewhat cylindrical in shape, and had ramifications of varying length from 4 to 6 inches (9 to 14 centimetres). The largest tube was as thick as a goose-quill, and it continued in ramifications thread-like in thickness, some ending in loops. No more physical signs of affections of the lungs, pharynx, or larynx were present. There was no more cough, pain in the chest, or dyspnoea. Ordered opium and acetate of lead. He observed some blood in the expectorations later, but the coughing was insignificant, and the patient continued her work. The pharynx was covered with yellow, thick, purulent masses and a dry mucus.

Symptomatology.—West ^{15 Aug.} found plastic bronchitis characterized by the occurrence of paroxysms of cough and dyspnoea, which immediately cease on expectoration of the casts. The paroxysms are usually preceded and followed by a sort of catarrh. Haemoptysis may be absent or it may be very serious. It usually ceases at once with the ejection of the casts. As a general thing but little pain is present, except that caused by coughing. In acute cases the temperature may rise to 104° F. (40° C.); in chronic cases it is seldom above normal. Sometimes the onset of an attack is marked by one or more rigors suggestive of pneumonia. As a rule, each attack consists of a number of short paroxysms. It may subside after a few days never to recur again, or may last continuously for ten, fifteen, or twenty years. Stirling ^{15 June} gives an accurate description of the physical signs found in a case of chronic plastic bronchitis: Chest symmetrical; expansion movements exceedingly slight laterally; anteriorly and posteriorly, normal. Percussion note impaired behind at bases, elsewhere it lacks fullness. Breath sounds practically inaudible over front and back, intense hollow blowing over the vertebrae above the level of the scapular spine. In the lower third of the left lung, front and back, friction-like sounds at the end of inspiration, which posteriorly were broken up; these resembled very thick, creaking râles. On the right lower

third in front some rumbling was audible with inspiration. The cardiac impulse was weak but definite in the fifth left intercostal space, a little within the nipple line. Heart-sounds slightly dull; praecordial dullness ordinary.

Treatment. — Simon ³⁰³_{June 3, June 20}⁹ recommends the careful surveillance of the secretion of urine in the management of capillary bronchitis in infants. The suppression may be the principal cause of the dyspnoea. If this occurs he gives digitalis, not in syrup or tincture, but 15 centigrammes ($2\frac{1}{4}$ grains) of the powdered leaves in infusion three times in twenty-four hours. At the same time he places a cataplasm over the kidneys and also uses dry cups. The cardiac contractions take on a more regular rhythm and the urinary secretions are restored. Burman ²⁶_{Apr. 1} recommends the use of iron in its strongest and most astringent forms in bronchitis when collapse threatens from suspended respiration due to abundant secretion, and thus to imperfect aération of the blood. Murrell ²²_{Nov. 6} highly commends inhalations of chloride of ammonium by means of an apparatus. This has been very successful in his hands, and he cites a number of cases cured by this remedy. Dembitz ²²⁴_{Dec. 22, 88} recommends apomorphine as an expectorant for infants instead of ipecac. His formula for administration is: Apomorphinæ muriatis, $\frac{1}{6}$ to $\frac{1}{2}$ grain (.01 to .03 gramme); aquæ destil., 4 ounces (118 grammes); acidi hydrochlorici, 5 drops (.33 gramme); syr. simpl., 1 ounce (29.5 grammes).—M. S.: Take 1 teaspoonful every two hours. Collapse need not be feared, and the apomorphia disturbs digestion less than ipecac. He considers musk the respiratory stimulant *par excellence*. He does not allow infants to sleep too long at one time or to lie any length of time in the same position. If crying makes them cough sometimes, it is all the better. The child should be carried about, and its position frequently changed in order that the secretions may be given less opportunity to settle down and occlude any one part of the smaller tubes. Much mucus may be expelled in producing increased movement of the chest-walls by means of pressure applied to the chest, like artificial respiration.

Lantier ¹⁴²_{June 15} relates a number of cases in which success was attained with the essence of pinus pumilio put up in transparent gelatin capsules the size of a small pea.

Flascher ²⁹⁶_{June 8} recommends the syrup of bananas as one of the

best remedies in chronic bronchitis, with insufficient expectoration and marked dyspnoea. He has never observed bad results to follow its administration. He prescribes 1 drachm (3 cubic centimetres) eight or ten times a day during the first days; later the dose can be diminished. He thus advises the preparation of the syrup: Cut the fruit in slices, place it in a glass vase, sprinkle with sugar, and close the vase, which is then enveloped in straw, placed in cold water, and heated to boiling. The bottle is then removed and allowed to cool and the syrup poured into small bottles.

Kisch ³⁵ _{July 4}, found pharmacy and mineral waters inadequate in relieving a case of chronic fibrinous bronchitis. He considers the malady rare, its diagnosis dependent upon the chemical and histological examinations of the concretions expectorated. He thinks the etiology and treatment as yet unexplored territory.

Stirling, ¹⁵ _{June} in plastic bronchitis, commends inhalations of alkalies, especially aqua calcis, alone or with equal parts of water, or with 2 to 5 per cent. of carbonate or bicarbonate of sodium, in which the casts are soluble. An emulsion of turpentine, copaiba, and oleoresin of cubeb to increase the plasticity of membrane. Removal to a warm, soothing climate would probably be more useful than drugs.

Simon ³⁰³ _{June 3; June 20} ⁹ advises stimulants in children, as champagne, eggnog, or toddies. He finds quinine most valuable during the entire course of the disease. It is usually administered in from 1- to 2.5- grain (.06 to .16 gramme) doses, and is best given as a potion in glycerin, with the addition of a little tartrate syrup. The child is well wrapped in bed and large sinapisms placed to the chest.

PLEURISY AND EMPYEMA.

Pathology.—In this chapter of the history of medical progress for the year 1889 there is but little for the historian to chronicle. The claims advanced by the French school, or rather by one faction of that school, in regard to the relation of tuberculosis and pleurisy have not been established, and no pathologists have given their adherence to this view who were formerly opposed to it. Among the clinicians who have published cases in opposition to this pathological doctrine, Bowditch ⁹ _{July 20} is the most prominent. He has made public the records of cases treated by him between the years 1849 and 1879, with their after histories. When the subsequent

history could not be ascertained the case was omitted. The number of cases with satisfactory histories was 90. His conclusions are as follow: "The result of this investigation shows us at least: (1) That whether we can prove absolutely, by such statistics, that all pleurisies are tubercular or not, yet a large percentage of these patients who were afflicted with pleurisy, often in apparently chronic forms, recovered their health and have never had any recurrence of the original trouble nor development of subsequent pulmonary or otherwise tubercular trouble; (2) that while undoubtedly there are many cases in which an attack of pleurisy is followed within a comparatively short space of time by pulmonary trouble, and, therefore, special care should be taken of the patient during convalescence from the former disease, yet we are not justified in giving such gloomy prognosis as we should be inclined by accepting the extreme views held by Landouzy and his followers. Let us be doubly on our guard, then, while looking for the truth, in accepting conclusions founded upon insufficient evidence, lest we run the risk of hindering what we most desire, viz., the recovery of our patients."

The investigations of Thue, of Christiana,⁵⁰ in regard to the relations of pneumonia and the complicating empyema, are very interesting. He found the lymphatics in the adherent pleura and pericardium full of pneumococci, and made successful cultures of these micro-organisms from the pus of an empyema complicating pneumonia.

Netter,¹⁴ _{Jan. 12} reports 46 cases of pleurisy. Of these no less than 40 were shown by his investigations to have been caused by the diplococcus pneumoniae. He divides pleurisy caused by the diplococcus pneumoniae into two classes; the first kind occurs after pneumonia, while the second appears without pneumonia. The first variety is usually purulent and susceptible to cure, although perforation of the lung and pneumothorax is not an uncommon complication. In 5 cases the author was able to prove the presence of the diplococcus pneumoniae by successful plate cultures. The author called attention to the occurrence of the second class of cases as early as 1886, and has observed 10 cases in all. Weichselbaum and Serafini have also made observations on this subject. In 8 cases they made bacteriological researches and experiments on animals, and found the diplococcus pneumoniae in

each case. Four times it was associated with the staphylococcus and streptococcus pyogenes, and in the remaining cases it alone was found. They believe that the great majority of all cases occurring in childhood, if purulent, are caused by the diplococcus pneumonia.

The expansion of a lung exposed to the pressure of the atmosphere through an opening in the chest-wall was the subject of an animated discussion, ably led by O'Dwyer⁵¹ before the American Pædiatric Society. No rational explanation has ever been given of a process so frequently observed at the bedside when old adhesions do not exist. He holds that the only rational explanation is that the collapsed lung is expanded by air forced from the sound lung into the diseased one by efforts at expiration with closed glottis, as in coughing. He suggests that some explanation must be found to account for the fact that the lung remains dilated, and advances a theory of his own that the attraction between the oxygen of the air and the haemoglobin of the blood helps to hold the air in the lung, and that the abstraction and vaporization of water from the capillaries may have something to do with keeping the lung expanded, as there is such an enormous increase in volume when water is vaporized.

Diagnosis.—There are few questions upon which authorities have differed more than upon the one in regard to the change of level of a pleuritic exudation as the patient's position is altered. Strauch,²⁰ in Ebstein's clinic in Göttingen, has examined 20 patients with special care, avoiding anything that might, by acting as a damper upon the thorax-wall, give rise to apparent dullness, such as pillows, mattress, supporting hands placed against the back, and so forth. He attributes many of the apparent changes in the level of dullness to these agents. In support of these views he advances the theory that the thorax-wall must be set in vibration and give character to the percussion sounds. If a damper is so applied as to stop these vibrations, a dull note results. A normal thorax, if percussed in the position a pleuritic patient assumes, will give a dull note on certain lines. In only 1 case out of the 20 did the examination reveal any change in the line of dullness.

The presence of subphrenic pyothorax can be recognized, according to Scheurlen,³⁰⁹ v.11, p.152, Apr. 13² by the results of high and low aspiration, in a large percentage of all cases. High punctures in

the fifth intercostal space shows a collection of pus or serum, while a low puncture, as the eighth intercostal space, yields a pus which is always ichorous. Pleuritic friction can be heard throughout the region of subphrenic dullness.

Provost,³⁹ of Ottawa, reports a case of serous effusion in which Bacelli's sign for purulent effusions, *i.e.*, absence of fremitus of the whispered voice, was present, and also cases of purulent effusions in which the whispered voice could be distinctly heard; thus showing, as Secretan has also done, that while this sign is of value at times, in other cases it is misleading.

Treatment.—Richard Otto,⁴⁰ of Dorpat, has found that a bandage $2\frac{1}{2}$ to 4 inches broad, applied tightly to the thorax, will greatly relieve the pain of a beginning pleurisy by hemming in the respiratory movements of the thorax. This compression is useful whether the inflammation has just begun, and is consequently confined to the visceral layer of the pleura, or whether it has passed over to the parietal layer. In the first stage the patient selects the affected side to lie on, while in the second he selects the well side. In either, if the bandage is tightly applied, it will give great relief. At first it is rather uncomfortable, but if removed at the solicitation of the patient he will soon beg to have it reapplied.

The position of Weil and others in regard to the aspiration of air from a pneumothorax, when a fistula with valvular opening exists in the lung, has been attacked by Baümler's student, Albersheim.⁵⁷ Weil says that if this point has been established by measuring the pressure within the pleural cavity nothing should be done for five or six weeks, in the hope that within that time the fistula may have become definitely closed. But this delay exposes the patient to the danger of the formation of adhesions which will effectually prevent the distention of the lung at any time. Albersheim claims that frequent aspirations will not prevent the definite closure of the fistula, and that they are invaluable to the integrity of the lung, as by frequent dilatations the circulation is re-established, and when the fistula has closed the lung is in condition to again functionate normally.

Injections of peroxide of hydrogen,⁷¹ 50-per-cent. solution, puts a rapid stop to the formation of pus in the thoracic cavity, as it does elsewhere, and has been very strongly recommended as an injection in empyema whenever injections must be used.

ŒDEMA OF THE LUNGS.

Grossmann, ¹¹⁴_{B.M.J. to 4; Apr. 11}⁸ in his remarkable experiments concerning œdema of the lungs, which have been carried out in the laboratory of von Basch in Vienna, has made some important discoveries. An acute general pulmonary œdema originates in dogs, and not, as hitherto supposed, in rabbits alone, from obstruction of the left auricle and compression of the left ventricle. He has learned that the transudation plays but a secondary rôle in the causation of the dyspnoea, and that the most important obstruction to respiration in the transudation is the inflexibility of the lung on account of the œdema. In consequence of the vascular engorgement there occurs an enlargement of the alveolar spaces; that is, an enlargement of the lungs. He considers transudation as a causative factor in dyspnoea of no importance. We not only have congestion and œdema through muscarin intoxication, but also swelling and stiffness of the lungs and bronchial cramps. He thought his investigation proved the primary cause of the congestion in the lungs to be the narrowing of the left side of the heart, contrary to the theory of Cohnheim and Welch, who consider it due to paralysis of the left side of the heart.

Moyer, ¹³⁹_{Sept.} in a recent discussion in the Chicago Pathological Society, took the stand against the majority of the members regarding the indications for pilocarpine in pulmonary œdema. His views meeting with scant support, he determined to try the drug in the first case which offered where there were no heart complications or present or threatened coma. A case recently came under his care presenting these conditions, and the drug was administered with the most happy effect.

EMPHYSEMA.

Etiology.—Huchard ³_{May}, reports an interesting case of subcutaneous emphysema in a child of 5 years who suffered from a frank pneumonia. The emphysema was very extensive. The irregularities of the temperature were extreme. The mobility of the symptoms and the production of a second pneumonia of the congestive form in the period of defervescence of the former lead to the belief that there was a malarial influence at work, a theory subsequently proved by the great benefit obtained from the use of sulphate of quinine. Wigmore ⁶_{May} reports an interesting case where a comparatively trifling injury was followed by

pneumothorax, emphysema, and death. A lady leaned forward against a knitting-needle and thrust it into her chest. She thought little of the accident, and went on with her usual occupations for some hours, when she was taken very ill and died, despite the use of all possible means for her relief. Carr⁶ had a case of general subcutaneous emphysema following aspiration of the chest. The patient was suffering from broncho-pneumonia, and, thinking a localized emphysema had resulted, he was aspirated with a large-sized needle with the ordinary Diculafoy's aspirator, which was introduced just below the angle of the scapula, and a vacuum made but no fluid obtained. The needle was withdrawn, and the puncture closed in the usual way with wool and collodion. The child coughed a little, and in about two hours Carr was called, and found subcutaneous emphysema, extending from the seat of puncture over the trunk and up the right side to the face. It yielded the characteristic crackling on pressure everywhere. In six or eight hours the swelling reached the maximum, and then involved the whole trunk, the right and, to a slight extent, the left sides of the scrotum. It formed a prominent collar around the neck and caused such puffiness of the eyelids as to completely close the right eye. There was no pneumothorax. Patient recovered, but died a little later of diphtheria, and a post-mortem was obtained showing a very interesting condition of affairs. Earle⁵¹ reported a case to the American Paediatric Society, in which a very extensive general subcutaneous emphysema succeeded a catarrhal pneumonia in a boy 3½ years old. The subcutaneous tissues of the forehead, cheeks, neck, and the entire trunk, anteriorly to Poupart's ligaments and posteriorly to the iliac crests, were filled with air. The child looked as if he would float on water. The respirations were hurried, the pulse moderately rapid, and the face, in addition to its peculiar appearance, had a worried and anxious look. It made its appearance first in the neck, and rapidly extended to every other part of the body except the scalp and legs. He considers the etiology of subcutaneous emphysema in children, and interference with or obstruction to respiration, as we find it in catarrhal pneumonia, capillary bronchitis, pertussis, croup, and diphtheria. It may arise from perforating laryngeal ulcerations, from rupture of tracheal rings either by force or the results of disease, from rupture of the cesophagus, and as a consequence of gastric ulcer.

Pathology.—Northrup^{Jan. 19} gave the history, before the N. Y. Pathological Society, of a female child 5 months old, which died, and the autopsy revealed that the left lung was the seat of an extensive interstitial emphysema of the upper lobe. Beaded rows of air-sacs radiated from root of the anterior margin, separating the lip of the lung so as to allow light to shine through from one lateral surface to another. One vesicle was larger than its fellows and separated the anterior upper lip of the lung more than a centimetre ($\frac{1}{3}$ inch); it bulged forward like a bladder of air under moderate pressure. Another air-bladder of similar size was at the posterior margin of the lower lobe. In the posterior portion of the apex was recent pneumonia extending about half-way from the apex to root, having upon the surface numerous petechiæ. The author had reported 1 other case and had seen 1 in the Museum of the Royal College of Physicians in London. These were the only cases in which he was aware of such extensive emphysema. Heitler⁸¹ _{Nos. 4, 5; Mar.}⁹⁰ refers at some length to the controversy on the true pathology of emphysema, and expresses his belief that a preliminary degeneration of the vesicular walls is a regular precursor of the condition. He points to many cases in support of his views, in which an undoubted emphysema has, little by little, been brought about without the presence of any of the usual mechanical causes. He observes that the trouble would be more frequent if mechanical causes were alone to blame.

Diagnosis.—Heitler⁸¹ _{Nos. 4, 5; Mar.}⁹⁰ says downward displacements of the liver may occur rather suddenly, and may so exercise traction on the diaphragm and the lung above as to lead to diagnosis of emphysema. The cardiac complications of dyspnoea he found difficult to define, as a rule, but in many cases the physical signs and even symptoms of mitral disease may be caused by changes on the right side of the heart. Diastolic murmurs without valvular changes have been frequently noted. When, as rarely happens, acute tuberculosis attacks an emphysematous lung, the diagnosis mainly rests upon the course of the temperature, the onset of the dyspnoea, and other evidences of grave affection of the lung without any physical signs to account for it. Where the tubercle supervenes upon acute bronchial catarrh or capillary bronchitis, the diagnosis is almost impossible.

Earle,⁵¹ in a case of general subcutaneous emphysema, band-

aged the child from feet to chin and administered a stimulative, supportive treatment. The child seemed to improve, but at last began to show signs of exhaustion and died the tenth day after the appearance of the complication. The propriety of puncturing the skin in different places was discussed, but it was thought the danger of infection would be added to those existing. Wigmore ⁶ _{May 25} experienced much relief by drawing the air from the chest by aspiration, though the relief obtained was only temporary.

PULMONARY TUMORS.

Wacquez ²²⁰ _{Apr. 22} reports at length a case of primary cancer of the lung. The pain suffered by his patient merits especial mention because of its rarity in pulmonary affections. Indeed, the occurrence was long denied. The question is, where did the neoplasm start? Was it in the epithelium of the alveola or of the bronchial canals? He thought it probable that the epithelioma originated in the finest ramifications of the bronchi. The microscopical preparations did not admit doubt as to the nature of the complaint, viz., a cylindrical epithelioma. An interesting fact in this case was the absence of the *souffle* in the presence of an excavation quite large enough and communicating with the bronchial cavity. Handford ² _{Mar. 9} presented a specimen to the London Pathological Society, which was referred to a committee, who in their report agreed with the views of the author that the specimen was a primary carcinoma of the mucous membrane of the bronchus. Gray ³⁶ _{Mar.} makes report of a case of intra-thoracic tumor, which was remarkable for the long absence of any physical signs and their sudden development. For quite a period no other diagnosis than intercostal neuralgia and muscular rheumatism seemed warranted. Enlargement of the cervical and sterno-mastoid glands, and thickening of the tissues of the back of the neck, led to suspicion of other trouble. The diagnosis was easily reduced to malignant tumor or specific growth. The latter was proven from the results of the administration of iodide of potassium. Girode ³⁶⁰ _{Jan.; Apr. 15} ¹³ reports a case where there was cancer of the stomach which extended to the pancreas, secondary nodes in the liver, advanced degeneration of the abdominal and mediastinal glands; cancerous lymphangitis of the pleura of the lungs and the pericardium, and no secondary deposits in the lungs. The course of the disease was very rapid,

resulting in death through asphyxia in two months. The post-mortem showed a true cancerous lymphangitis.

Bock⁸² reports a case of primary sarcoma of the lung. He dwells with special emphasis on the means of differentiating these tumors from emphysema of the lung, for which they seem universally mistaken. The only certain sign is that elicited by the exploring needle, which, however, must not be too small, and must be inserted at various points in the intercostal spaces to a considerable depth. The exuding fluid should be subjected to a microscopical examination, which may reveal the nature of the disease. The principal diagnostic signs are the peculiarly even distention of that side of the barrel-shaped thorax; the stretched but not bulging intercostal spaces; the passive dilatation of the superficial veins of the affected side; the greater resistance felt by the finger on percussion, and the total absence of respiratory sounds of the affected side. Huber²¹⁴ _{Feb. 15} relates an instance of sarcoma of the lung, in which pieces of the tumor were coughed out. This is so rare an occurrence, according to the author, that but one other case is on record, which was reported by Hampeln.²¹ Shattuck⁹⁹ _{June 6} reports a rare form of tumor, a myxosarcoma of the chest, probably originating from the cartilage of a rib or bronchial tube. It is so rare as to receive but a passing mention in the pathological and clinical text-books. The lung is not an infrequent seat of metastatic deposits of chondroma, but no extra-thoracic source can be discovered in this case. The tendency of the disease to extend outward rather than inward leads him to believe that it started from a rib, rather than from a bronchial cartilage in this patient.

Fraenkel⁴¹ _{Feb. 23} reports a case of pulmonary stone. No bacilli were found in the secretion nor in the concretion. The size of the concrements was from a millet-seed to a nut, and probably consisted of calcified bronchial glands.

Arnold⁶¹⁵ _{Mar.} reports an interesting case of bronchocele in a boy aged 16, who suffered severely from dyspnoea, which was relieved by the introduction of a tube. He had an enlarged thyroid gland, lateral pressure on which caused increased dyspnoea, while pressure on the isthmus from before relieved the difficulty of breathing.

Lillies,²⁸⁵ _{Sep. 15, '88} had a case of foreign body, a stone, in the left bronchus, which presented several points of interest. The foreign

body entered the left bronchus instead of the right. It remained in the air-passages one hundred and four days. It shows what little trouble a foreign body may give when once safely through the glottis, as for fifty days, until inflammatory mischief supervened, it caused but little inconvenience to the patient. There was a period of quiescence for fourteen or fifteen days in which the child improved very much and gained strength. It recovered with amazing rapidity. He had become very emaciated and weak. Five days after the expectoration of the stone the improvement, both in his appearance and condition of his lungs, was wonderful; his cough almost altogether disappeared; vesicular breathing was heard all over the back, but there was still some slight dullness at the base.

Moscato⁷⁷² No. 1, p. 234 relates a case where a woman, at intervals of some months or a year, expelled small calculi by coughing. On examination by analysis they were found to contain traces of albuminoid material, with chloride of lime, chloride of sodium, and chloride of magnesium. Neither uric acid or oxalate of lime were present, nor were there any carbonates, phosphates, or sulphates. The absence of oxalate of lime differentiated the calculi in these cases from those occasionally expelled by patients suffering from asthma. He maintains that they probably originated in the bronchial mucous membrane, as they are known to do in the lingual, salivary, and other glands. The streaks of blood, according to the author, found in the sputum were due to detachment of the calculi. He thinks his case unique in medical literature.

ASTHMA.

Occurrence.—Moncorvo^{118 51} Jan.; June shows the fallaciousness of the old belief, that children possess an immunity from asthma. It is found in all classes, all ages, and almost all countries.

Pathology.—Cameron² June, believes that the primary spasm of the bronchial muscles leads to a subsequent temporary paralysis, by which the increased demand on the external muscles and the dyspnœa is prolonged. He supposed that in health the involuntary muscles of the bronchial tubes were actively concerned in respiration. These are probably muscles of expiration, and spasms of the bronchial muscles in asthma render them for a time incapable of performing their functions. The consequent unusual

demand on the external muscles of respiration manifests itself in an intense dyspnoea.

Etiology.—Da Costa ⁹⁹ Dec. 29, '88 presented to a class in a clinical lecture the case of a boy who was picked up in the street, suffering from a severe attack of spasmodic asthma, induced by swallowing a piece of apple which he was eating when overcome by an epileptic seizure. The apple, being drawn into the bronchus, caused serious trouble until expelled by a fit of coughing.

Robinson ⁹ Aug. 31 reports cases which show very evident causative influence of malarial poisoning in producing bronchial irritation and asthma. In some of these the ordinary means failed entirely. Quinine and Warburg's Extract caused immediate improvement.

Knight ⁹⁹ Jan. 17 gives an interesting case of a lady aged 28 years. The asthma was caused by a bean which had gained access when she was 6 years old. Tracheotomy was performed, the foreign body was not then expelled, but in a violent fit of coughing three days later. This was succeeded by a severe cough for months, which was soon attended by asthma, to which she has been subject ever since.

Bosworth ¹ Dec. 29, '88 refers again to the statistics of his 80 cases reported last year, and in view of the results of treatment he thinks that it may be fairly claimed that of the three elements which enter into the causation of asthma, viz., a neurotic habit, the nasal disease, and atmospheric conditions, the nasal disorder outweighs in importance not only the neurotic but all other elements of causation.

Schmidtborn ⁴⁰⁴ _{No. 322, Apr.} ¹³ comes to the conclusion that the nature of the nervous asthma is a reflected cramp of the pulmonary arteries.

Van Valzah ⁹ May 11 reports a case which illustrates in a marked degree the prolonged and terrible asthma which may be produced by indigestible foods, acidity and fermentation, distention of the stomach and bowels with gases, and the absorption of morbid material by the blood, in one with a predisposition to the disease. He thinks derangement of the digestion a frequent factor in the causation of asthma.

Pawinski ⁴ Dec. 10, '88 discusses asthma caused by acetone in the urine. Acetone is linked to an increased decomposition of the tissues, as is well known. Accumulation of the substance in large amounts acts as a profound poison to the central nervous system. System-

atic examination of the urine in cases of asthma, especially where etiology is at all obscure, may lead to the detection of conditions not now recognized as predisposing causes of asthma.

Berkart¹⁰²⁹ puts forward a theory, a further development of that of Curschmann's. In his opinion, asthma is due to a progressive inflammatory process affecting the air-passages. Starting from the pharynx, it spreads rapidly upward to the nose and eyes, whereas its downward extension is, for a time at least, arrested by the larynx, as erysipelas is arrested by a projecting fold of skin. Resistance is, however, subsequently overcome and the air-passages invaded. The tissues are gradually altered structurally and their reactions differ. The sero-fibrinous exudation becomes more and more fibrinous, and the consequent mechanical interference with the respiratory function now constitutes the most striking of all its symptoms. Berkart is inclined to see the causative agent of the progressive inflammation in a streptococcus which he invariably found in the expectoration. This is associated with Curschmann's spirals and more abundantly present in recent than in old specimens. He thinks this species of streptococcus nearly allied to, if not identical with, the streptococcus erysipelas. The author does not believe in the pollen theory of the origin of hay fever, asking that, if this be true, why does the disease commence invariably in the pharynx and not in the eyes or nose—the parts with which the irritatory body first comes in contact? He considers the symptoms of hay fever more a progressive form of inflammation commencing in the pharynx.

Peyer⁴⁷⁵_{11.9; Aug. 31} discusses at length and reports *in extenso* 16 cases of sexual asthma. Eleven of these were males, of whom 9 suffered from spermatorrhœa. In most cases this was accompanied by functional anomalies, of which the most frequent were nocturnal pollutions and impotence, or at least a reduced potency. In 2 cases a temporary aspermatism. Of the 5 cases occurring in females 1 had fibroid of the uterus; 1 vaginal and cervical catarrh, with hyperæsthesia of the introitus vaginae in consequence of masturbation; 1 leucorrhœa; 1 enlargement and induration of the uterus, with catarrh following the menopause; 1 chronic endometritis. Of the 11 male patients, 7 were very strong, well-built men, the others slender. In about all the males was present that row of nervous symptoms designated sexual neurasthenia, which almost

without exception was caused by sexual abuse. In but 2 could a family history of neurosis be elicited. The female patients all suffered more or less from nervous or hysterical troubles, which, like the asthma, depended on the uterine difficulty. In all there was emphysema, which caused no great inconvenience. In some of these the sexual act was followed with such regularity by asthma that the connection between them was quite clear. The author thinks the importance of the knowledge of the exciting influence of the genital system upon asthma should not be overlooked. We should learn if our patients have suffered from nocturnal incontinence of urine, if sexual abuse of any kind had been practiced in youth, or if sexual diseases had been contracted. The menses, their duration, the molimen, the fluor albus and pain in the lumbar region must be inquired after. If by questioning a leader is gained, then a sexual examination can be requested, and other causes being excluded sexual asthma can be diagnosed. This sort of asthma is naturally not so stubborn as some other kinds. Peyer claims that asthma is always neurotic. In 2 young married women, coitus caused violent attacks of asthmatic sneezing. In another case the patient suffered from uterine fibroid with severe asthma, which disappeared after the removal of the tumor. Another was subjected to asthmatic attacks, which were cured when she became pregnant for the first time. Another suffered from chronic metritis, the cure of which relieved the asthma. In all the reported cases the patients were more or less hysterical and there was a distinct history of neuroses in the family of 2. The possible coincidence of true asthma and disease of the sexual functions and the alleged form where the former is the effect of the latter should be carefully distinguished. It is easy to understand that any aggravation of uterine or ovarian disease and any irritation of the sexual functions might intensify the asthma.

Treatment.—Grancher ⁵⁵ _{Apr. 20} recommends, in the treatment of asthma in children, 3 doses, 5 to 7 grains (0.3 to 0.4 gramme), of quinine given at intervals of ten minutes five or six hours before the paroxysm. Woodbury ⁶⁰ _{Mar. 20, May 11} advises centesimal solution of nitro-glycerin in from 2- to 5- drop doses where there is little emphysema and the heart is sound. Between the attacks, quinine, arsenic, or cod-liver oil.

An editorial writer ²⁵⁷ _{Nov.} thinks that of the remedies which have

recently forced themselves into the foreground citrate of caffeine, perhaps, stands first. The recommended dose is from 1 to 5 grains (0.06 to 0.3 gramme) dissolved in warm water. The relief afforded is said to be very prompt. Arsenic, probably on account of its peculiar property of supporting respiration in making ascents, seems to produce striking cures in appropriate cases. Cocaine, $\frac{1}{6}$ grain (0.01 gramme), in tablet form relieves the spasms. Quebracho is a remedy in much repute, and if the flow from the mucous surfaces is very great 15-drop doses of tinct. belladonnæ every four hours are good. If much bronchial tumefaction and dryness are present $\frac{1}{4}$ grain (0.016 gramme) pilocarpine, with $\frac{1}{4}$ grain (0.016 gramme) morphine hypodermically, gives prompt relief.

Allbutt¹²⁹ has had good results from Davos Platz, Switzerland, and from the use of hyoscyamine, arseniate of strychnine, digitalis, and aconitum after the dosimetric system.

Poulet³³ has found oxalic acid a remedy of great importance in asthma and bronchial dyspnoea. It prevents the crisis when recourse is had to its use some hours before the invasion. It is not less useful when the attack has already commenced or is imminent. The medicine is a faithful antidyphnoeal remedy at an insignificant price. He gives oxalic acid, $\frac{1}{2}$ drachm (1.94 grammes); syrup of orange-peel, 2 ounces (62 grammes); infusion of tea, 6 ounces (186 grammes). Sig.: Tablespoonful every hour till relieved.

Lanphear⁷² says the great principle in the prevention of attacks is that the patient should retire with gastric digestion quite complete, and thus preclude the pressure upward against the diaphragm from flatulent accumulations in the stomach. When there is dyspepsia present, and especially when flatulence occurs after meals, it is advisable to omit sugar, starch, and potatoes as much as possible.

Silva Nunès, of Rio,² claims that the tincture of lobelia should not be used in asthma, as alcohol extracts the emetic principle. The alkaloid lobeline antagonizes the spasm without causing either nausea or vomiting. The dose varies from $\frac{2}{3}$ grain to 6 grains (0.048 to 0.39 gramme), and is pushed according to the symptoms. It can also be employed hypodermically. In Nunès's cases he seems to have obtained excellent results from lobeline in the treatment of spasmodic asthma and bronchitic dyspnoea. Many months after

taking the lobeline his cases appear permanently cured. If the temporary good which has hitherto been gained from lobelia in asthma can be obtained from the alkaloid without nausea, vomiting, or depression, it will prove a boon to suffering humanity.

Berkart¹⁰²⁹ places greatest reliance on the subcutaneous injection of morphine, which produces speedy relief, probably by relieving the bronchial tenesmus. In chronic cases he attaches most importance to rest. He rates iodide of potassium moderately, but highly commends jaborandi, or its alkaloid, pilocarpine. In hay asthma, and in asthma beginning its acute attacks with sneezing and a burning sensation at the back of the soft palate, he recommends the use of a gargle or spray of borax in concentrated solution, with a few drops of liq. hydrarg. perchloridi. Quinine in 15-grain (1 gramm) doses is favorably commented upon.

Illingworth,²² _{July 24} acting on the view that the disease is due to central venous congestion, gives remedies, first, to stimulate the heart; secondly, to prevent congestion; and, thirdly, to contract the central and dilate the peripheral blood-vessels. The first two indications are met by the carbonate and acetate of ammonia and the iodides and nitrates of potash and soda, also by alcoholic stimulants, and the third by belladonna. Jores¹¹⁶ _{Apr.; May 25}⁶¹ found relief speedily given in a very stubborn case by inhalations of a 20-per-cent. solution of menthol in oleum olivæ.

Duenas⁷⁷³ _{Oct. '88; Apr. '20}² concludes that antipyrin is a drug of extraordinary value in asthma at first, but, like all other remedies, it soon loses its power. It has no effect in diminishing the frequency of attacks. He had found it sometimes did harm in increasing the severity of subsequent attacks, particularly in a case of asthma with bronchitis. Zipp,⁶⁹ _{May 16} in cases where the cause is suspected to be the nose, recommends widening of the nasal air-passages by bougies. He introduces Hegar's bougies with ease, dispensing with narcosis or assistance.

Carl Grunert¹⁰³⁰ describes a chair for the treatment of asthma, so constructed by means of levers and bands as to exert pressure on the thorax, while by means of a broad band the intra-abdominal pressure is increased. The ultimate effect, according to the author, is to render forced expiration possible, to considerably decrease the volume of the thorax, and to more completely empty the hitherto badly-aërated alveoli, so that more oxygen enters at the next

inspiration and very soon the dyspnoea diminishes. The cases reported show that in many instances the respiration chair might prove an advantageous method of treatment. Scott ⁷⁶⁰_{Aug. 10} has found paraldehyde in half-drachm (1.9 gramme) doses a valuable remedy in cutting short the asthmatic paroxysms. He finds it acts better when combined with other agents.

Peyer ⁴⁷⁵_{Aug. 31}² thinks the treatment of sexual asthma depends upon its origin. The physician should not neglect through false prudery to call attention to the bad results of onanism and coitus imperfectus. In 1 case reported by Peyer, pollutions and asthma were not improved by local treatment, because the patient continued to practice the coitus reservatus. After the cessation of this custom the conditions disappeared under regular evening applications of clysters. Those etiological factors of sexual asthma, urethritis posterior, as well as spermatorrhœa, impotence, and temporary aspermatism, as a rule, must receive local treatment.

Davis ⁶¹_{Mar. 25} occasionally found in women who were persistently troubled with asthma during pregnancy, though free from it at other times, marked improvement resulting from the constant use of viburnum prunifolium. This drug lessens the irritability of the uterine tissues and thus diminishes the asthma.

PULMONARY SYPHILIS.

Gulliver ²_{Mar. 9} presented and described a specimen of syphilitic ulceration of the trachea and large bronchi before the London Pathological Society. The case was a female aged 32. The ulcers, which were in the lower part of the trachea and bronchi, were elongated in form and transverse in direction. Besides the ulceration, there had also been some constriction. Ulceration of the palate was the other syphilitic lesion found, and bronchopneumonia caused her death.

Stuart, Shattuck, and Bowditch report cases ⁹⁹_{Dec. 20} of pulmonary syphilis, and suggest if every case of pulmonary tuberculosis were treated with mercury and iodide of potash more might be cured.

Dieulafoy ³⁶³_{Nos. 11 to 22} reports a series of cases of syphilis of the lung and pleura. From histological examination he arrives at the conclusion that acute syphilis of the lungs begins with a bronchopneumonia which, in a few days, leads to cheesy degeneration. The physical symptoms are generally those of lung tuberculosis.

He found the disease most often limited to the middle part of the right lung. The dyspnoea is intense and has no relation to the lesion present.

Potain¹⁵² _{Mar. 2} describes a case which was apyretic; there were no apical signs and the patient had formerly contracted syphilis. The case was one of lung disease of two months' duration, with signs of consolidation at the right base. As a diagnostic aid he places small stress on the detection of Lustgarten's bacillus in the sputum, and demonstrates that the microbe, if such there be, is not likely to be found in the stage of simple congestion or of non-softened gumma. He admits the rarity of observations on the subject and states that a Russian author, in 21,757 post-mortem examinations, found syphilis in 2.3 per cent. Visceral syphilis was present in 88 cases and in 11 of these were pulmonary lesions. He also affirms that pulmonary syphilis only attacks the right side. Renzi¹⁵² _{Dec. 6, 8, '83} has a very complete course of lectures on this subject.

PULMONARY ACTINOMYCOSIS.

Israel²⁰ _{B. 74, 78; B. 79, 79} in 1878 first describes this affection in man, since which time case after case has been reported. One of the most interesting of these is by Lindt,²¹⁴ _{May 30} where the patient died and a very careful post-mortem was made. Laker^{113, 147} _{June 30, July 7, 14; June} presented a case of primary actinomycosis of the lungs at a meeting of the Society of Physicians of Styria. Patient was admitted for a suppurative process in the upper sternal region. Numerous granules of actinomycotic fungus were found in the pus, and the affection was recognized as actinomycosis of the lungs. He complained only of intermittent pains of varying intensity on the right side of the chest. The expectoration did not exceed 30 grammes (1 ounce) in twenty-four hours. He was greatly emaciated. The abdominal walls were pale and yellowish in color; the chest shortened, and higher on the right side than the left. This differed from other recorded cases, in which the affected side was markedly retracted. In the right intra-clavicular region there was a dull, tympanitic percussion note. At the inner side of the nipple there was also an area the size of the palm of the hand, over which was a dullness, bronchial breathing, and increased vocal resonance. The perforation was about 5 centimetres (2 inches) below the nipple, and discharged a large quantity of pus, with numerous actinomycetes. Above this

spot was a *bruit de pôt fêlé*. From the clavicle downward there was emphysema of the skin. The apex of the heart was in the fifth intercostal space; the sounds were normal. In the second intercostal space was a slight systolic and diastolic murmur; it was not impossible that the formation of an aneurism was in progress. The patient was very anaemic, the haemoglobin in the blood being reduced 25 per cent. There was no albumen in the urine. The doctor demonstrated the presence of the granules in the sputum, and displayed the readiness with which a diagnosis between this disease and the chronic pneumonic process could be made, even without the aid of a microscope.

Sokoloff⁵⁰⁹ _{No. 25, 1881; Apr.}¹⁰⁹ describes a remarkably rare case of actinomycosis of the lungs in a soldier aged 25, who was admitted in the sixth week of a severe typhoid fever. Croupous pneumonia of the left lung with numerous pneumococci soon developed; actinomycetes in large numbers were discovered. One week later a localized percussion was recognized in the lower lobe of the right lung. The patient died in a few days from prostration and cardiac failure. The necropsy revealed, besides typhoid lesions in the intestines and pneumonic infiltrations on the left side, an actinomycotic focus as large as an orange, situated in the posterior portion of the lower lobe of the right lung. The case presented a unique instance of simultaneous mixed infection by the pathogenic microbes of actinomycosis, croupous pneumonia, and typhoid fever. The diagnosis of pulmonary actinomycosis was made during the patient's life, solely by means of the examination of his expectoration. This was the fourth instance of an *intra vitum* diagnosis of the disease. The sputum as well as the lung-tissue contained only threads of the actinocladothrix, but no club-shaped bodies. It had the characteristic appearance of red currant jelly, and was very viscid. The cladothrix proved to stain well after Ehrlich's method, which, up to date, has been regarded as the specific one for dyeing the tubercle bacillus and those of leprosy only.

Rütimeyer⁴ _{No. 3, 1884} reports the case of a 25-year-old factory hand, who at first complained of ill-defined lung trouble on the left side, and was referred to the surgical clinic for an operation on a fluctuating swelling in the left thoracic wall. The incision permitted the escape of large numbers of actinomycetes, so that the diagnosis was immediately fixed; also a great number of hardened

fungi were found in the sputum. The general health went down rapidly despite repeated surgical interference, although the lung trouble did not seem to grow worse. The patient died under symptoms of dropsy and heart weakness. Post-mortem revealed a keg-formed section of the lung affected, which extended from the hilus of the left lung toward the middle of the anterior and lateral lung surface. There was an extensive swelling of the pericardium and the pleura, as well as destruction of the soft parts of a portion of the thorax wall; no further metastasis. He showed macroscopic and microscopic preparations, and recommended creasote as a remedy.

MEDIASTINAL DISEASE.

Hare¹⁰³¹ enters into this subject very thoroughly. He gives the record of 134 cases of mediastinal cancer, 98 cases of sarcoma, 115 cases of abscess, 16 cases of non-suppurative inflammation, 21 cases of lymphoma, 7 cases of fibroma, 6 cases of haematoma, 11 dermoid cysts, 8 hydatid cysts, and 104 cases of various mediastinal diseases. The author makes a brief summary of his conclusions as follows: 1. Cancer is more frequently found in the mediastinal spaces than any other morbid process. 2. Abscess is the morbid process next in frequency of occurrence. 3. Sarcoma occupies the third position as to frequency of occurrence. 4. Lymphomata and lymphadenomata occupy a fourth place, but are much more rare than the others mentioned. 5. The anterior mediastinum is affected far more frequently than the other two spaces. 6. Most mediastinal growths occur in adults. 7. More males are affected by forms of mediastinal disease than females. 8. Cancer and sarcoma of this space are necessarily fatal. 9. About 40 per cent. of the cases of abscess recover.

Edwards⁵¹,_{July} reports a case of carcinoma of the mediastinum in a child, and reviews 67 cases previously recorded. He finds it varies in children from that in adults, in that sarcoma is the most frequent morbid process, carcinoma next, and abscess third in order.

DISEASES OF THE HEART, PERICARDIUM, AND ARTERIES.

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ASSISTED BY

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ARTERIAL DISEASE.

Arterio-Sclerosis and Plethora.—G. Séé¹⁴ points out the etiological relationship of plethora to arterio-sclerosis. Arterio-sclerosis is the most frequent disease met with after the age of 50, and is generally discovered post-mortem. Two causes contribute to its development: (1) physical causes, namely, intra-vascular obstacles, which increase vascular pressure and owe their origin to disregard of hygienic laws, excesses, or sedentary life; (2) chemical, toxic, autotoxic, and infectious agents; alcohol, gout, diabetes, syphilis, and other infectious diseases. In the well-to-do classes there are two categories of individuals who early develop increased arterial tension: (a) those who take much food and little exercise and develop adipose tissue; (b) thin, sometimes anaemic individuals who are compelled to live a sedentary life. Every copious repast determines a certain temporary vascular plethora. If more food is ingested before the previous plethora has been disposed of, there gradually is established a permanent vascular repletion.

Insufficient exercise increases venous stasis and diminishes oxidations, thus favoring adipose formation. Adipose tissue is deposited principally in the abdominal wall, mesentery, and about the kidneys, and this obstructs the abdominal circulation and indirectly raises the pressure in the aorta. Abdominal plethora is analogous in its effects to excitation of the splanchnic vasomotor nerves in contracting the abdominal vessels, thus driving the blood toward the heart and increasing arterial pressure. Similarly, the accumulation of adipose tissue in the abdomen intensifies the incessant inundation of the vascular system by the excessive quantities

of digested aliments. General plethora results from the abdominal plethora. In consequence of the compression of the intestinal vessels, the capacity of the arteries is diminished, and, as the latter, by reason of their tendency to contract cannot receive an excess of blood, a large amount of blood is forced into the veins. Thus, besides an increase of aortic pressure, a considerable venous distension is produced, showing itself in superficial varices, haemorrhoids, predisposition to pulmonary catarrh. Obstruction of the portal circulation hinders digestion, causes constipation and excessive flatulence, which, in turn, react by still further obstructing the circulation. For the sedentary, the same causes account for increased blood-pressure, but in the poorly-nourished the plethora is limited to the abdominal vessels, and is due to the absence of the *vis a tergo* in the venous channels. The portal veins having no valves, their circulation is kept up principally by physical exercise. The development of sclerosis is always preceded by this stage of increased vascular tension. This abnormal pressure is the principal cause of endarteritis.

Arterial Murmurs.—Sidney Phillips^{6, May 18} calls attention to a "subclavian murmur," heard immediately below the middle of the clavicle when patient's arm is dependent. Heard on both sides, but more commonly, especially in females, on the left. Rough, short, abrupt, systolic, and heard loudish during inspiration. Gentle pressure above clavicle intensifies, and firm pressure causes it to disappear. Often accompanied by systolic thrill over the artery. It is most common in anæmic girls, especially those showing high tension in radial artery. Heard also in some other conditions: aortic regurgitations, marked atheroma of vessels, and in some persons after sudden muscular efforts. B. W. Richardson, in 1862, found this murmur in 2.5 per cent. of 2000 patients, associated, in order of frequency, with bronchitis, phthisis, anæmia, dyspepsia, and chronic heart disease. Causation: (1) an insufficient filling of arteries; (2) want of arterial tonus and a flaccid condition of the arterial wall. Inspiration increases the murmur by allowing dilatation of the flaccid artery, owing to the diminished intrathoracic pressure during this period, thus increasing the disproportion between the arterial calibre and its contents. Murmur is more frequent on left side because of greater length of left subclavian artery. Anæmic murmurs more common in pulmonary

artery than in aorta, because former is thinner walled and less elastic, and therefore more susceptible to variations of intra-thoracic pressure.

The Elasticity of Healthy and Diseased Arteries.—Thoma and his pupil, Kaefer,²⁹ after an extended study of the subject, draw the following conclusions: 1. The development of primary arterio-sclerosis does not progress uniformly in the various divisions of the aortic system. 2. Simultaneously with the beginning of thickening of the intima in certain vascular regions, there is found in others diminished elasticity and weakening of the wall before the development of any anatomical change is demonstrable. 3. The weakening of the vessel-wall increases, while here and there appear the first traces of thickening of the intima, and in this stage of the disease the danger of the formation of arterio-sclerotic aneurisms is greatest. 4. In the further course of arterio-sclerosis a thickening of the intima occurs, by which the vessel-wall is strengthened and its elasticity increased. The danger of aneurismal formation is thereby substantially obviated, and at the same time the pulse becomes slower and the left ventricle hypertrophies.

Effect of Entrance of Air into the Circulation.—H. A. Hare⁸⁰ _{Sept.} presents the results of careful experiments on over 70 dogs. Air was injected by a syringe into the jugular vein almost instantaneously in quantities varying from a minute bubble to 40 cubic centimetres. The experiments prove that the injection of large amounts of air into the jugular vein causes no effects whatever except slight quickening of respiration, with slight fall of pressure and slight slowing of the pulse. These effects were very brief. When 20 cubic centimetres of air are injected into the carotid artery the effect is quite different. Respiration ceases at once; the animal becomes unconscious and apparently dead, save for the action of the heart, which keeps on as if nothing had occurred. In a moment respirations are renewed; the breathing becomes at first more powerful, then less and less so, until death really ensues,—a result which may be indefinitely postponed by keeping up artificial respiration. Sometimes the animal recovers independently of such aid. The conclusions reached are that enormous amounts of air must enter a vein to cause death, and no such quantity can possibly find its way into veins injured by the surgeon's knife. In the reported cases of sudden death during operations in which veins were opened, the cause of death has not been

proved. The possibility of death from air entering the uterine sinuses is not discussed, but it is admitted that the anatomical arrangement of these veins renders the entrance of large amounts of air more easy of accomplishment. The writer thinks that there is no support for the theories which ascribe death to capillary embolism by air, or to interference with the closure of the valves of the heart. His explanation is that air, except in very large amounts, when injected into the jugular vein is carried to the lungs, and through them expired. The large amounts injected into the carotid may cause clots and the formation of emboli. Air injected into the jugular vein is prevented from forming clots by the venous character of the blood.

Fatty Embolism.—Grube, of Kharkov, Russia,^{96 June} states that fatty embolism may occur as late as a fortnight after a traumatic injury. Sources are fractures of bones and also crushes of soft parts. Diagnostic points are dyspnœa, fall of temperature, and fat in the urine (generally intermittent). Prophylaxis: absolute rest for the injured limb (no massage).

Treatment.—Cardiac tonics and diuretics, the latter to promote excretions of fat through the kidneys. Zahn^{20 Jan.} discusses what he calls paradoxical embolism, by which he means the occurrence of embolism from solid masses which escape from the right auricle into the left auricle through a patent foramen ovale. The possibility of its occurrence is well shown by the fact that out of 711 autopsies the foramen was found patent in 139, or in 19.5 per cent. A case of embolism of the radial artery is reported by Rosenheim, assistant in Senator's clinic.^{4 Mar.} After speaking of the rarity of cases of embolism of the arteries of the upper extremities, he reviews the few cases which have been reported. The symptoms in these cases were: sudden pain and loss of power; coldness, later œdema; pulse absent, but often again perceptible in a short time; anaesthesia of skin, discolouration, falling of finger-nails, gangrene in case of embolism of the upper part of brachial artery.

Symptoms in reporter's case were: sudden cramp-like pain in epigastrium, dyspnœa, flashes of light, temporary aphasia, pain and swelling in the left arm, absent radial pulse, coldness and pallor of extremity, impaired motion, paræsthesia. Within a week the pulse was normal, and other symptoms had disappeared. No source of the embolism was apparent.

A case of thrombosis of the aorta was reported by Pitt ² _{May 25} to the Pathological Society of London. The specimen consisted of the transverse and descending portions of the thoracic aorta, which contained a large, firmly-adherent, decolorized thrombus. Aortic wall atheromatous. No symptoms were present during life. The patient was a feeble man of 56 years, who had died a few days after the removal of an epithelioma from the jaw. Extensive thrombosis of the aorta is extremely rare.

ANEURISMS.

Syphilitic Aneurisms.—Mauriac, of the Hôpital du Midi, ¹⁴ _{May 6} thinks that, at present, the frequency of syphilis as a factor in the etiology of aneurisms is overestimated. On what is the diagnosis of syphilitic etiology based? On the fact that the aneurism occurs in one affected with syphilis and that iodide of potash relieves or cures. To be certain that an aneurism is the result of syphilis the following points must be established: 1. Infection, more or less recent, in a young subject who has not yet reached the age at which atheromatous arteries are found. 2. Absence of hereditary taint of rheumatism or gout. 3. Complete absence of all the causes—hygienic, professional, traumatic—susceptible of injuring the aorta. 4. Other evidences of syphilis. 5. Results of treatment. Without fulfilling all of these ideal requirements, many cases approach sufficiently close to leave no doubt of their specific nature even in the most skeptical minds. It does not follow that the lesion is syphilitic because the patient has had syphilis. In many aneurisms attributed to syphilis it is only rarely that lesions of the same origin, recent or still active, are found in other parts of the body. Finally, in regard to treatment, such authorities as Byron Bramwell, Dreschfeld, Lancereaux, Lecorché, and Talamon have obtained excellent results from iodides associated with mercurial inunctions, even in cases which were not syphilitic. Therefore, the success of such treatment is not sufficient to establish the diagnosis.

H. M. Briggs ⁵ _{Mar.} reports 34 cases of aortic aneurism with autopsies. There were 26 cases of aneurism of the thoracic aorta, situated as follows: 12 of the ascending portion of the arch, 4 at the junction of the ascending and transverse portions, 1 of the transverse portion, 3 at the juncture of transverse and descending portions, and 4 arose from the descending portion of the arch.

In 28 cases there were only 11 in which there was a history suggestive of aneurism. Contrary to what would, *à priori*, be supposed, death occurred in but few instances during severe muscular exercise. This fact does not tend to confirm the usual opinion that severe strains have no longer an influence, as has been ascribed to them in the production of the dilatation and rupture of the aorta. As to pathology of aneurismal dilatation of the aorta, the author thinks that far too much emphasis has been ordinarily placed on endarteritis and atheroma of the intima. The changes in the majority of cases are situated in the middle coat, and consist of granular disintegration and disappearance of the elastic fibres and fatty degeneration of the muscle-cells. There may or may not be changes in the intima. In the writer's experience in those cases in which there was the greatest change in the intima, as a rule no dilatation, or very slight dilatation, was present. Enlargement of the heart is a rare exception in simple, uncomplicated cases of aortic aneurism, even if large size and multiple. It is found only when other causes of hypertrophy are also present, such as affections of the myocardium or the valves, or general arterial disease. Rupture of aortic aneurisms and rupture of the aorta together form one of the most frequent causes of sudden death occurring without previous symptoms.

Diagnosis of Aneurisms of the Descending Aorta.—Ferdinand Schnell,³⁴ _{July 22} presents a new and ingenious means of diagnosis. An ordinary soft-rubber stomach-tube, closed at its lower end and containing at its upper end a glass tube, is filled with a colored fluid up to the glass tubing. This is introduced into the oesophagus in the usual manner. If an aneurism of the descending aorta is present, its pulsations are transmitted to the fluid in the tube and can thus be recognized. In this way the exact situation of the aneurism can be determined. Aneurismatoscope is the term applied to the apparatus.

A case of rupture of an aortic aneurism into the superior vena cava is reported by Richard Sisley.⁶ _{June 15} Man, aged 35, with following symptoms: Cough, but no dyspnoea; slight oedema of face and eyelids, especially in evening after work; finally, cyanosis of face, neck, and arms; pulsation of cephalic and jugular veins. Was admitted to the hospital, and rapidly became more cyanosed, drowsy, then comatose, and died in two hours. At autopsy there was found

a small aneurism posteriorly just above the aortic valves, and a small opening with thin, ragged edges connecting with the superior vena cava. During life a double murmur had been heard over the middle of the sternum. Libson, in a careful analysis of 900 cases of aortic aneurism, found only 7 of rupture into the superior vena cava and 28 of rupture into the pericardium.

A similar case is reported by Gairdner. ^{June 22}⁶ The patient was a laborer, aged 44. Symptoms were: very marked cyanosis, with general oedema of the upper part of the body; distention of superficial veins over the front of the chest and of the arms; rapid action of the heart (110 beats per minute); right radial pulse stronger than left; slight pulsation in jugular fossa; a double murmur over the cardiac area; dullness under the manubrium and to the right and left; slight cough, but no dyspnoea until just before death, which seemed to be due to failure of the respiratory reflexes. Autopsy showed aneurism of the arch of the aorta, with an opening into the superior vena cava $\frac{1}{4}$ inch (6 millimetres) in diameter and $\frac{3}{4}$ inch (18 millimetres) beneath the origin of the innominate vein.

Another case, reported by Arkle and Bradford, ^{Dec. 21, 1888}² is remarkable for the length of time which the patient survived. Shoemaker, aged 61, complained of pain in chest and dyspnoea. Ten days before death was seized with sudden pain in neck, and rapidly became very cyanotic in the face. Edema soon appeared about the neck and right arm, and, to a less extent, over the chest. Veins were dilated at borders of sternum and lower margin of thorax. Pulsation in second and third right interspaces, and over this region a thrill and sniffle which was loudest at the systole. At autopsy there was found a large aneurism of the ascending and transverse portions of the arch of the aorta communicating by a small opening with the superior vena cava. It was thought, from the symptoms and appearance of the perforation, that the latter had occurred ten days before death, with onset of above symptoms.

Aortic Aneurism Communicating with the Pulmonary Artery.

—F. P. Henry ^{July}¹¹² reports the following case: The patient was a man who complained of haemoptysis, dyspnoea, and pain in the chest. There was general oedema, most marked in the lower limbs and scrotum, and considerable ascites. In the left infra-clavicular region there was dullness, pulsation, thrill, and systolic murmur.

There was no inequality of radial and carotid pulses, or of the pupils, and no dysphagia. Autopsy showed an aortic aneurism occupying the right sinus of Valsalva, and communicating with the pulmonary artery by an oval aperture, $\frac{1}{4}$ inch (6 millimetres) in diameter, which was evidently of long standing. The author reviews 7 similar cases, in 5 of which there was clear anatomical and clinical evidence of the existence of communication between the aorta and pulmonary artery for periods ranging from four months to twelve hours. These facts contradict the statements generally made, as, for example, that of Garland:¹¹⁵³ "After rupture into the pulmonary artery death follows immediately." Cases of aneurism of the aorta communicating with the venous circulation, through the superior vena cava, right auricle, right ventricle, or the pulmonary artery, are called by Thurnam "spontaneous varicose aneurism." Oedema, more or less general, is a constant symptom in these cases. When the communication is between the descending aorta and the inferior vena cava, the dropsy is limited to the lower half of the body; when between the ascending aorta and the superior vena cava, it is most marked in the arms, face, and upper half of the trunk; when between the ascending aorta and one of the right or left cavities of the heart or the pulmonary artery, it is universal.

A case of rupture of an aortic aneurism into the œsophagus, and survival for nearly thirty-six hours, is reported by A. J. Sprague^{186 Sept.}: Woman, aged 36, who complained of no symptoms except occasional slight dysphagia, had a sudden haemorrhage from the mouth of 1 or 2 pints ($\frac{1}{2}$ or 1 litre) of bright arterial blood, and a few minutes later vomited 4 or 5 pints (2 or $2\frac{1}{2}$ litres) more. Felt quite well next day, and got out of bed twice. On the second night, while asleep, a sudden fatal haemorrhage occurred. At autopsy there was found an aneurism the size of an egg projecting from the posterior surface of the transverse portion of the arch of the aorta, the posterior part of the sac being united to the œsophagus, through the wall of which was a perforation $\frac{1}{2}$ by $\frac{3}{4}$ inch (12 by 18 millimetres). This opening was plugged up by a clot of blood.

Treatment of Aortic Aneurisms.—In a discussion before the Berlin Medical Society,^{41 Apr. 18} Litten said that treatment must be essentially symptomatic. He recommended hypodermic injections of antipyrin for pain, and was well pleased with sulfonal in cases

of sleeplessness. He had no confidence in iodide of potash, except in syphilitic cases. Electricity is of service in paralysis of recurrent laryngeal nerve. Radical treatment by galvano-puncture, by injection of coagulating fluids, or by the introduction of foreign bodies, always fails, and often accelerates death. Senator considered iodide of potash curative. He had cured 3 out of 8 cases of aneurism of the abdominal aorta by keeping the patient on his back for several months and using methodical compression. Ewald agreed with Senator. At the autopsy he had frequently found syphilitic lesions, even where there was no visible syphilitic manifestation during life.

Kerr, University of California,¹⁴⁷ reports 2 cases of aneurism of the ascending portion of the aorta, which were treated by Loretta's method combined with electrolysis. Six to ten feet of fine silver wire were introduced into the aneurismal sac by being pushed through a hypodermic needle, and the positive poles of the battery connected with the wire, the negative electrode being placed on the epigastrium. The first patient died on the eighteenth day after the operation, and the wire and sides of the sac were found covered with a firm clot. In the second case the patient left the hospital, apparently well, two months after the operation. F. F. Meriwether²⁰⁷ reports the cure of a large aneurism of the ascending aorta after simultaneous ligation of the common carotid and subclavian artery.

Spontaneous cure of an aortic abdominal aneurism is reported by Vogel.⁴ An aortic aneurism, of at least the size of an apple, was situated just below the diaphragm. The diagnosis was established by Esmarch, Neuber, and many others who observed the patient for several months. The patient was a young man, who attributed the disease to overexertion during a fire. He was kept under treatment several months, and then sent home to die as a hopeless case. After awhile the patient began to get well: the pulsation and tenderness diminished, and finally disappeared. He was kept under observation for six years, until every sign of the aneurism had disappeared, and he could work as hard as usual with no discomfort.

PERICARDITIS.

Etiology.—Hayem and Tissier,⁹² in a valuable contribution to the study of tubercular pericarditis, say that this form of the

disease is usually, and perhaps always, due to extension by contiguity, whether from a carious sternum or spinal column, or from an adherent and tuberculous pleura, or from tuberculous bronchial glands. Cuopf.³⁴ in a lecture on pericarditis in children, reports 10 cases out of a total of 459 patients with different diseases. Of these, 3 were in the first year of life, 3 in the second, and the other 4 from 6 to 10 $\frac{1}{2}$ years. In but one case was the disease primary. Single cases suffered at the same time with "tuberculosis, pneumonia, and pleurisy on the right side;" cheesy bronchial glands and right-sided pleurisy; "pneumonia and pleurisy on the right side;" "pneumonia and bilateral pleurisy" [tubercular ?]; "bilateral catarrhal pneumonia and left-sided pleurisy;" catarrhal pneumonia; and chorea, respectively. Two followed scarlet fever. Indeed, exanthemata are among the most frequent cases of pericarditis in children, while the rheumatic form is as rare as is acute articular rheumatism in early life. Sucklings, he states, are liable to a septic form of the disease, either derived from the mother or due to infection through the navel. Tuberculosis is a prominent cause. Inflammation may extend to the pericardium from the pleura, lungs, ribs, sternum, vertebræ, bronchial or mediastinal glands, the thymus gland or the œsophagus. The primary inflammation may even be in the peritoneum, liver, or spleen. Sometimes, of course, it is due to nephritis; sometimes to trauma, and rarely no etiology whatever can be made out. Parker and S. West^{2,88} both believe that purulent pericarditis may sometimes be primary; that is, not associated with suppuration elsewhere.

Symptomatology and Diagnosis.—The acknowledged latency of many cases of pericarditis—nay, more, the difficulty of detecting it, even when suspected—make welcome two new aids to diagnosis, which have this in common—that they depend upon changes in the physical signs consequent upon change in the position of the patient: 1. Von Stoffella, of Vienna,⁵⁷ has observed that in cases of pericarditis with effusion, where, upon examination of the patient in bed, there is distinct dullness on percussion over the base of the heart, upon making the patient sit up in bed the dullness is changed to resonance. This change from dullness to resonance he ascribes to the effect of gravity in lowering the position of the fluid, upon the assumption of a

vertical posture toward the heart's apex. 2. E. Pins¹¹³ says that in cases of pericarditis with effusion it is not rare to find, upon percussion in the sitting position, a muffled tympanitic or dull area in the left side of the chest, extending from the angle of the scapula downward and merging into the area of splenic dullness, reaching also laterally to the line of the axilla. This dull area is most marked in a circular spot about the size of a silver dollar, beginning about three fingers' breadths below the angle of the scapula, and extending to two fingers' breadths from the lower edge of the lungs. Over this spot of greatest dullness are to be heard distinct bronchial breathing, increased vocal resonance, and bronchophony. No crepitant râles nor friction sounds are audible in the dull area. If now we ask the patient to bend forward, and, after pausing a few minutes, repeat our examination, we find that the results of percussion are strikingly altered. In the place which was previously dull there is a good resonance, and in the place of most marked dullness there is a tympanitic sound upon percussion, while the bronchial breathing has either diminished or disappeared. The same change occurs, or is even more marked, if the patient is made to lie upon his left side, and it is most marked of all if he (in favorable cases) can assume the knee-elbow position. After the patient has remained for a few minutes in this last posture the dullness will be found to have disappeared almost entirely, except for a narrow strip corresponding to the lower edge of the lungs. These physical signs are not observable until the pericarditis has lasted several days, and vanish long before its other symptoms disappear. The explanation of this phenomenon is found by Pins in the backward displacement of the heart from the pressure of the fluid collected in the pericardial sac, and the correction of this abnormal position by the effect of gravity when the patient changes his posture.

ENDOCARDITIS.

Infectious Endocarditis.—Jaccoud¹⁷_{Feb. 28} prefers the name infectious endocarditis rather than ulcerative or vegetating, applying the latter two to anatomical varieties of the disease. He distinguishes three forms of onset: 1. Rapid onset with continuous fever from the beginning. 2. Rapid onset with complete intermissions of fever, the intermissions lasting from four to seven days. 3. Slow onset with intermissions of fever. This may continue

for six weeks, the febrile attacks not occurring periodically and being separated by several days of apyrexia. After the fever is established it does not run a high course, is not constant, and if hyperpyrexia occur it is only of short duration. During this period four varieties may be distinguished: 1. Continuous fever, with slight morning remissions. 2. Continuous fever, with irregular rises of temperature, which escape notice unless the thermometer is used oftener than twice a day. 3. The fever may continue intermittent to the end. 4. Not only may the fever fail to be continuous, but the disease itself advances by bounds. Periods of several days, marked by apyrexia and a feeling of *bien-être*, are followed by several days of fever and rapid advance of the disease. This course may be explained by a general infection of the blood, occurring at certain moments when the ulceration process detaches infectious particles from the endocardium. Can any relation be established between these varieties of onset and progress of the disease and some particular variety of pathogenic microbe? Yes, to a certain extent. The continuous febrile type, or continuous with paroxysms, is associated essentially with the pneumococcus. The form which begins and continues intermittent depends on pyogenic microbes. No relationship exists between the duration of the disease and the variety of microbe. There is a third microbe whose characters do not correspond to the pneumococcus or the pyogenic microbe. Its cultures are gray rather than white, with a clear portion at the centre or at one extremity. It is innocuous to pigs, but when inoculated in the rabbit by Netter has produced, on the sigmoid valve and in the carotid, vegetations composed of bacilli similar to those of the culture. It is the "gray bacillus of endocarditis," recently discovered by Weichselbaum, of Vienna. Thus, endocarditis, unlike tuberculosis, charbon, and some other diseases, may be produced by a variety of microbes. At least ten different varieties of microbes have been discovered in endocarditis by different observers, but the pneumococcus and the pyogenic micrococcus are the most common, having been found in 53 out of 62 cases.

The disease is not common, in spite of the large number of microbes and the numerous conditions in which it may originate. The microbes cannot reach the endocardium until they gain access to the blood, which is not common, and, moreover, a local vulnera-

bility of the endocardium is necessary. Experimentally, one cannot produce infectious endocarditis in animals without previously wounding the endocardium. In many cases the point of entrance of the microbes cannot be discovered, and is then probably through the respiratory passages. The infectious material generally passes first through the right heart, and yet it is only rarely infected. Rosenbach has called attention to the fact that the microbes have a great affinity for blood rich in oxygen, and therefore they find more favorable conditions in the left heart.

Sée¹⁴ Dec. 5, '88 gives an interesting and complete review of the work which has been done in establishing the microbial origin of endocarditis. The ulcerative and warty varieties are essentially the same and differ only in their anatomical form. Wysskowitsch has demonstrated that, in the rabbit at least, the valves must first be injured before micro-organisms can be successfully implanted on them. In the dog, endocarditis could be produced by injecting the microbes into the veins without previous injury to the valves. Recently, Gilbert has discovered a special form of bacteria, which will provoke endocarditis, even in the rabbit, without previous lesion of the valves. If the microbes are injected before irritating the valves, ulcerative endocarditis is produced; after a valvular lesion, a warty endocarditis is produced. This shows that there is no difference in the nature of the two varieties. Many different kinds of microbes have been found. Netter, studying 82 cases of endocarditis coincident with pneumonia, discovered on the valves in a certain number of cases the pneumococcus of Fraenkel. By inoculating the pneumococcus thus obtained he produced in animals pneumonia with fibrinous pleurisy. Sometimes endocarditis would be produced first and then pneumonia, and in some case endocarditis alone was produced by the pneumococcus of Fraenkel. These results have been confirmed by several other observers. In a case of typhoid fever complicated with endocarditis, Senger was unable to find the typhoid bacillus of Eberth on the valves, but he found a streptococcus, which was also found in the suppurating mesenteric glands. In this case, therefore, the endocarditis was secondary to a septic infection through the intestinal ulcerations. Frequently, several varieties of bacteria are associated in the same case of endocarditis. Thus, it has been shown (1) that microbes are found in every case of endocarditis; (2) that these microbes

are not always of the same variety; (3) that in a given case several varieties may be combined. Do the symptoms of endocarditis vary with the variety of microbes, and can we, from the symptoms, decide that the disease is produced by this or that microbe, as, for instance, the pneumococcus, the streptococcus, etc.? We can, perhaps, recognize two types: that produced by (1) the pneumococcus, and (2) that produced by pyogenic microbes (staphylococcus or streptococcus). The first has the following characters: it affects by preference the aortic valves and has but little tendency to produce embolism. If, at the same time, pneumonia or cerebro-spinal meningitis appear, we have to do almost certainly with the pneumococcus. In endocarditis due to pyogenic micrococci, emboli are more frequent and generalized. The mitral valve is generally affected. In case of the streptococcus the progress of the disease is more violent, and death ensues rapidly. The infarcts are of a whitish color. In the case of the staphylococcus the infarcts undergo suppuration, and the course of the disease is less rapid. In many cases, as the disease is due to the association of different microbes, the symptoms are mixed and diagnosis is difficult.

Gilbert and Lion^{3, Jan. 16} discovered last year a microbe in a case of infectious endocarditis, and have since then been studying it in the laboratory. Recently, Girode found the same microbe in 3 out of 5 cases of infectious endocarditis. Gilbert and Lion, by the experimental inoculation of this microbe in rabbits, without previous injury of the valves, produced the lesions of endocarditis on the mitral and tricuspid valves. This result was constantly produced by inoculation of old cultures, and occasionally with fresh cultures. In two-thirds of the cases death occurred in a few days, with symptoms of spinal meningitis, which was verified by autopsy. The others, after apparent recovery, died finally of paralysis, due to the poisons produced by the microbes. By carefully injecting the toxic products sterilized, the rabbits were "vaccinated" so that they were not affected by injections of the microbes.

A case of malignant endocarditis, with infection apparently from urethritis, is reported by Ely.^{59, Mar. 26} The patient died at the Roosevelt Hospital after a few days' sickness, marked by a stupid, typhoidal condition. The autopsy showed the usual lesions of malignant endocarditis, involving the mitral valve. There were embolic infarctions of the spleen and kidneys. No source of

infection could be found except a purulent urethritis. Microscopical examination showed the presence of *staphylococcus pyogenes aureus* and *streptococcus pyogenes* in the vegetations on the mitral valve, in the infarctions in the spleen and kidneys, and in the pus from the urethra. In a review of the literature of this subject, 9 cases were found in which malignant endocarditis was found to originate from purulent urethritis.

A case of primary ulcerative endocarditis, limited to the tricuspid valve, is reported by Trumbull.⁵ A man had been suffering for eight or nine days with chills, fever, headache, inability to continue work, great weakness, loss of appetite, and slight diarrhoea. On examination, a small, double pleuritic effusion was found, and enlargement of the liver and spleen. No increase of cardiac dullness, and the valvular sounds normal, with the exception of a "probable murmur" at the pulmonary valve. Pulse 120. The temperature was very irregular, with repeated chills. Repeated attacks of sudden dyspnoea and intense cyanosis were observed. Edema of the legs and a purpuric eruption soon appeared, and the patient died fourteen days from the beginning of the illness. At autopsy there was found pleural effusion, haemorrhagic infarctions of the lungs and kidneys, with multiple purulent foci. On the tricuspid valve large, crumbling masses of vegetations were found. The other valves normal. No source of infection could be discovered.

VALVULAR DISEASE.

Etiology.—Nikiforow, of St. Petersburg,⁵⁹ reports a case of syphilitic disease of the mitral valve. Post-mortem, a node was found upon the valve, close to the myocardium, which, upon section, presented firm cicatricial tissue, with a central cheesy mass. There were in other organs characteristic tertiary lesions. Jacoud¹⁷⁷ has met with a case of mitral valvular disease following a contusion of the left chest. The patient was a young man of 28 years, who had some years previously fallen from a horse and bruised the left side of his chest, from which time his symptoms dated. There was no history of any of the diseases which ordinarily predispose to endocarditis. Post-mortem examination showed an extremely severe stenosis of the mitral orifice, with calcified vegetations. Ritter⁴ reports a similar case of valvular stenosis following fracture of the sternum. Shortly before his discharge

from the hospital, to which he had been taken when the accident occurred, the heart was found to be normal. Five months later, however, there were distinct signs of the mitral lesion. Germain Sée,¹¹⁵² _{Vol. I; June 27} ¹⁵² asserts that all forms of endocarditis, with the single exception of aortic valvular disease consequent on arterial degeneration, are of parasitic origin.

M. F. Cox,²² in a paper on acute cardiac affections, says that he has come to regard acute endocarditis as one of the most frequent of acute constitutional diseases, and far more prevalent than acute pericarditis. The frequency and the severity of the heart affection in rheumatic fever he does not find to be in direct proportion to the severity of the arthritis nor to the elevation of the temperature. In fact, the heart trouble may develop unattended by pyrexia, and is "more often in indirect rather than in direct ratio to the joint trouble." With regard to etiology, he believes that acute rheumatic endocarditis and pericarditis are the result of a neurosis, a disturbance of the trophic centre or centres, disturbing alike the heart and joints. Kintzing, of Baltimore,^{1,29} discusses cardiac disease in negroes. A fraction over 50 per cent. of all the cases in his clinic were of the negro race. The relative frequency of functional cardiac disturbances in the negro and the white race was about 3 to 1. About two-thirds of the total number of mitral lesions occurred in the colored race. In aortic valvular disease there was a preponderance of the negroes over the whites, but not so great as in the previous instances. With regard to etiology, he believes that specific disease plays an important part, as well as rheumatism, scrofula, and general neglect of hygienic precautions, and, above all, the amount and severe kinds of labor which the negroes perform.

Symptoms.—A brief report of some of the discussions still going on with regard to the exact origin of the presystolic murmur can hardly be omitted. Dickinson,⁶ _{Oct. 19} in a fresh paper, endeavors to maintain his well-known ground. He sums up the leading points of his article directed against the presystolic theory as follows: 1. The loudness and suggestion of force belonging to the so-called presystolic murmur seem incompatible with the power of the left auricle or with the negative "suction" action of the left ventricle. 2. The murmur in question is heard at the same time that the heaving of the apex is felt, both ending simultaneously.

3. The pulse as felt in the carotid artery follows the murmur without an interval, showing that the murmur belongs to the contraction of the ventricles. 4. There is a true auriculo-ventricular murmur, not, however, the one to which the term "presystolic" is applied, differing from the latter in time and character, and, when heard in the same patient, disconnected from it. It should be added that he regards the first sound of the heart as made within its cavity and independent of the cardiac muscle; that is, without a muscular element. He also asserts that the knock or snap heard at the end of the murmur of mitral stenosis is at the end of systole.

Acland⁶ calls attention, first, to the fact that in cases of mitral stenosis there is "often heard a soft, blowing murmur following the snap, which is generally admitted to be a systolic or regurgitant following a presystolic or direct murmur," and he sees no other reasonable explanation of these sounds. Hence the "snap" cannot be at the end of systole. Secondly, the carotid pulse has been shown to occur only one-tenth of a second after the commencement of systole, while Dickinson places the time of its occurrence subsequent to the snap; that is, after systole has actually ended, if we allow the snap to be, as he claims, at the end of that phase of the heart's action. Thirdly, the carotid pulse, in ordinary cases of mitral regurgitation, is felt not after the murmur is over, but during its continuance; and, again, if this snapping sound occurs at the end of systole, we should hear the sound of the closure of the tricuspid valves at the beginning of the systole, whereas we do not; and, once more, in cases combined with tricuspid regurgitation, the tricuspid murmur should, if Dickinson be correct, be synchronous with the "presystolic" murmur, which has never been observed. The murmur which Dickinson calls the true direct or presystolic murmur should be immediately followed by the sharp closure of the healthy tricuspid valves, supposing, as he claims, that the first sound of the heart is purely valvular; for he asserts that this diastolic murmur is separated from the presystolic, so-called, by the commencement of systole. Acland is not unnaturally loath to admit that the first sound of the heart has no true muscular element, strengthening his ground by the observation that a hypertrophied heart gives a loud, booming, systolic sound, while with a small and weak ventricle the sound is short and sharp. In a clinical lecture on mitral stenosis the same writer⁶ enters very

fully into the whole matter, summing up with the following statements: (a) that the murmur of mitral stenosis occurs during the diastolic period; (b) that it is not always or solely auriculo-systolic; (c) that its essential characteristics are due to the fact that the murmur is produced largely by the suction of the ventricle and the passage of blood over a rough surface into the expanding cavity; (d) that the snap is not due to the sharp closure of the thickened valves during the systolic period; (e) that it occurs at the commencement of the ventricular systole, and is due to the increased rapidity of ventricular contraction coupled with increased sharpness of closure on the part of the tricuspid, and at times also of the mitral valves.

F. C. Turner⁶,¹⁷ supports the Barclay-Dickinson view: If the mitral curtains are rigid, they must be slow in closing, thus giving an opportunity for a reflux of blood over a rough surface, with the development of a harsh murmur. The character of this systolic murmur changes when the valves have snapped together, because their contact with each other prevents their further vibration. That there is time for the development of such a systolic murmur is shown (a) by the analogous occurrence in some instances of a pre-diastolic murmur in the aorta, (b) by the clinical evidence of retardation of the cardiac action in states of quiescence in the subjects of mitral stenosis, and (c) by cardiographic tracings, showing an abnormally long interval between the auricular systole and the apex-beat. The weakness of the auriculo-systolic view is that there is no proof that the auricle is contracting at the time that the bruit is heard, or that the auricular and ventricular contractions do, or could, occur in such a way as to produce a bruit of the precise characters of the "presystolic" bruit, *i.e.*, an auricular systole causing an influx of blood into the ventricle, increasing in force and volume to within an inappreciable interval from the first sound, and followed by a ventricular contraction so rapid as to arrest the auriculo-ventricular influx at its maximum and close and make tense the rigid mitral curtains in an inappreciable space of time.

Fenwick and Overend⁶,¹⁸ have made a valuable contribution to the subject of the presystolic murmur, as well as certain other points connected with the physiology of the cardiac valves. In 2 cases of mitral stenosis they endeavored to determine by a cardio-

graph and a registering drum the exact time of the presystolic murmur, and they found that in one case, where there was "a loud presystolic murmur audible at the apex, beginning immediately after the second sound and lasting throughout the diastole," it occurred immediately after the depression in the wave of the cardiogram—that is, before the systole; and in a second case, where there was a presystolic *bruit* apparently commencing about the middle of diastole and ending abruptly at the first sound, and also a well-marked systolic bruit, the murmur occurred just before the ventricular systole and during the auricular contraction. The presystolic thrill they find to be identical in time with the presystolic murmur. By constricting the left auriculo-ventricular valve in a rabbit, they were able to produce a well-marked presystolic murmur, heard over the ventricle. As to the different varieties of diastolic mitral murmur, they are inclined to attribute the early diastolic to the combined action of two factors, namely, the pulmonary tension behind and the negative pressure of the left ventricle in front. This is the murmur which is to be distinguished from that of aortic regurgitation or, in rare cases, pulmonary regurgitation. The mid-diastolic mitral murmur they regard as dependent for its production upon the intra-pulmonary pressure, while the strictly presystolic murmur is due to the enforcement of the tension in the pulmonary veins by the contraction of the left auricle.

E. S. Reynolds,⁹ in a paper called out by Dickinson's contribution, ⁶ makes the following claims: In the first place, the so-called snap does not occur at the time of systole, but at its commencement; secondly, Dickinson has mistaken for the true apex-beat the slight elevation of the praecordia due to the articular systole; thirdly, the difficulty which Dickinson finds in understanding the existence of a mitral diastolic murmur and a mitral presystolic murmur, both due to a single current of blood, and yet separated by an interval, is to be explained as follows: The early diastolic murmur is due to the high tension of the blood in the pulmonary veins and left auricle. As the blood rushes through the stenosed mitral valve this tension gradually diminishes and the murmur tends to grow feebler until the auricular systole occurs, when the murmur, which may have actually disappeared, becomes loud again. This long diastolic mitral murmur Reynolds is accustomed to call, metaphorically, the "hour-glass" murmur, because it grows weaker

and then loud again. Lastly, while Dickinson claims that the so-called presystolic murmur and the true systolic murmur run into each other without anything to separate them, the snap does form a distinct separation between them.

The Value of the Diastolic Murmur as a Symptom of Aortic Regurgitation.—Arthur Klein⁸ says there are cases of aortic insufficiency without a murmur, and, on the other hand, diastolic murmurs at the base of the heart without aortic insufficiency. Defect in the aortic valves may exist without a murmur being perceived: 1. When the lesion is small. Here, however, increased activity of the heart may render the murmur audible. 2. When the murmur is, as it were, drowned by the valvular second sound. Here immediate auscultation with the ear often enables us to detect a murmur which is not audible with the stethoscope. 3. Where the blood-tension is low, as in aortic stenosis, mitral regurgitation, or immediately after haemorrhage. Both the diastolic murmur and symptoms of aortic insufficiency may disappear because of inflammatory deposits upon the valves. The murmur of aortic regurgitation may be simulated by a diastolic anaemic murmur heard in the great veins and associated with the *bruit du diable* in the neck; secondly, by pericardial vegetations; thirdly, by a relative insufficiency; and, fourthly, by cases of aneurism, where the dilatation is separated from the aortic valves by healthy tissue, and the murmur is due to the propulsion of blood out of the aneurismal sac during the arterial systole (which is simultaneous with the cardiac diastole); or, again, where the aneurism involved the aorta immediately above healthy semi-lunar valves, and the murmur is due to a backward flow of blood through the narrow mouth of the sac.

Karl Dehio⁸⁴ remarks that where there is merely a small defect in the aortic valves the only change in the heart-sounds may be accentuation of the second aortic sound. In other points he confirms Klein's statements; and he further states that there is sometimes to be heard a diastolic murmur associated with the *pulsus celer*, where there is neither aneurism nor anaemia, nor the probability of a relative insufficiency, and for which no anatomical explanation has yet been given.

Graham Steel¹⁵ in considering aortic disease of the heart, calls attention to the occurrence of a systolic aortic murmur where the valves are healthy, while the aorta just beyond is dilated, the

murmur being referable to a "relative constriction." The author feels able, under the following circumstances, to diagnose a very considerable obstruction at the aortic orifice, namely, when the "murmur is peculiarly prolonged, harsh, often accompanied by thrill, not rarely conducted to the apex of the heart, and often audible in the upper left interscapular region, although not in the neighborhood of the inferior angle of the scapula. The second sound in cases of this kind often cannot be heard, but there is seldom any diastolic murmur. The aortic diastolic apex-murmur and thrill are usually easily distinguished from the mitral diastolic murmur and thrill by the presence of all the vascular phenomena of free aortic regurgitation, and by the absence of a history of rheumatism. With an aortic diastolic apex-murmur and a history of rheumatism, it is impossible to exclude mitral regurgitation, and the autopsy revealing both lesions may leave us doubtful as to which of them, during life, had occasioned the apex-thrill and murmur." When there is aortic incompetence there is rarely present what the author calls the pseudo-presystolic murmur at the apex; and he lays down the clinical rule "that in the presence of evidence of pronounced aortic regurgitation, and especially when there has been no history of rheumatism, the diagnosis of concomitant mitral stenosis must be made with the greatest possible caution." Martius,⁴ discussing the diagnostic value of the apex-beat, calls attention to the astonishing incongruity sometimes to be observed between the extent and vigor of the apex impulse and the smallness and compressibility of the pulse, of which he gives an example in the case of a soldier who suffered from the effects of overstrain of the heart; and he also refers to similar observations by Huppert, Da Costa, Seitz, and Thurn. This remarkable discrepancy he explains as follows: With the beginning of systole the intra-ventricular tension gradually rises until it exceeds that in the aorta, whereupon the semi-lunar valves are forced open. During this first portion of the systole, while the ventricle is a closed cavity, the apex-beat occurs, and during this time alone, as the author has proved by cardiograms taken during systole; that is, the apex-beat occurs while the heart maintains its maximum size, the ventricles being full of blood. Now, in the author's opinion, it is the increased size, and not the increased vigor, of the heart which produces the exaggerated impulse. Let a healthy, vigorous laborer exert himself, and yet,

although his heart is above the average in strength, there will be no subjective palpitation and no objective increase in vigor of the heart's impulse against the chest. The hypertrophied heart of aortic regurgitation, however, does exhibit a powerful apex-beat, and yet it does not exceed the heart of the laborer in strength, but in size alone. Whether dilated or hypertrophied, however different the amount of work accomplished, the apex-beat is practically the same. In the cases under consideration the heart is enfeebled by previous overstrain, and is also beating faster than normal; hence there is a gradual accumulation of blood in the ventricle, and a consequent acute dilatation.

Perret²¹¹,_{July 7} calls attention to what he terms the "peripheral" signs of mitral stenosis. First, the sense of touch enables us to detect a hesitating pulse, a quick apex-blow, and even the reduplication of the second sound (by placing the hand over the praecordial region). Secondly, on auscultation over the carotid we may detect the double second sound and also the "diastolic" roll. He adds, further, that the reduplicated second sound is to be heard over a larger extent of the praecordia than has been usually believed, that its most frequent location is in the third and fourth left intercostal spaces, and that from this point it can be traced sometimes toward the apex and into the axilla, or even as far as the vertebral column.

Leudet³¹⁵,_{June} gives a *résumé* of 172 cases, 2 of which came under his personal observation, and in all but 3 of which a post-mortem was made. The disease may be either congenital or acquired. In the congenital cases the symptomatology varies. There may be no symptoms or there may be simply a frequent dry cough with intense dyspnoea. The fingers are apt to be clubbed. Cyanosis, which is the most frequent objective evidence of the condition, is really due to an accessory lesion, namely, the persistence of the foramen ovale. Upon auscultation we may find (1) a systolic souffle, sometimes loud and extending over the whole praecordia, with its maximum intensity situated at the lower extremity of the sternum near its left border, and this not due to the stenosis itself, but to the passage of blood through the abnormal openings connecting the right and left cavities of the heart; (2) a feeble diastolic souffle; (3) a rolling sound, systolic and in part diastolic. Sometimes there is increased dullness to the right of the sternum, caused by enlargement of the right auricle. The force of the heart's

impulse varies greatly. The pulse is seldom regular. The diagnosis of the condition is extremely difficult, and it requires the exclusion of congenital pulmonary stenosis and other causes of cyanosis, such as persistence of the Botallian foramen and enlargement of the bronchial glands. The prognosis is most unfavorable. The child may die during the first week of life, and yet life has been prolonged to the age of 25 years. With regard to the acquired form of the lesion, out of 117 cases under consideration there were 57 in which no antecedent causative disease was made out. In the other 60 were 49 cases with an antecedent history of rheumatism; 1 with a history of chorea and typhoid fever; 1 with typhoid fever alone; 3 with scarlet fever and heredity of rheumatism or phthisis; 1 with measles; 7 with overexertion and debility; there were also cases of rachitis, syphilis, and pulmonary phthisis. In but 2 cases did the disease seem to be due to heredity. Women are more liable to the disease than men. Out of 104 autopsies 86 were women, 22 were men, and in 6 the sex was not mentioned. The other orifices may be affected at the same time with the tricuspid. In most cases we find the tricuspid stenosis associated with stenosis of the mitral valve. It is this combination of valvular lesions which makes it difficult to single out the signs which are referable to the tricuspid stenosis itself. Edema, dyspnoea, and cyanosis are prominent symptoms. On palpation there is, according to some authors, a presystolic thrill to be perceived at the level of the xiphoid cartilage. Others deny the existence of this sign. Percussion shows an increase in the area of praecordial dullness, but the heart's apex is in its normal position. Upon auscultation some authors have found a diastolic or presystolic murmur over the right side of the heart. This presystolic souffle is heard near the sternum, sometimes at the right of the xiphoid cartilage, where the fifth and sixth ribs join together, but more often near the left border of the sternum. The character of the souffle may approach a rolling sound or be somewhat harsh. In the vessels there may be a venous presystolic pulse, but this is the exception, although the veins are usually swollen and distended. It is, according to most authorities, impossible to make, during life, a diagnosis of tricuspid obstruction, but the author believes the contrary; nevertheless, out of the 117 cases cited the correct diagnosis was formed in but 6. Often, indeed, no effort is

made to determine whether the lesion exists or not. Where localization of a cardiac lesion is impossible it is, of course, far more probable that the disease is in the left side of the heart than in the right. Death is usually due to cardiac failure, but sometimes to rupture of the heart or to cerebral embolism. Treatment avails little, digitalis being the drug most likely to alleviate the symptoms.

J. C. S. Vaughan ²² June 23 reports 2 cases of tricuspid stenosis with autopsies, of which he gives the following summary: 1. Both were females. 2. One died at 26, the other at 51. 3. In neither case was there any antecedent history of rheumatism, and both cases were probably acquired. 4. Cyanosis was not present in either of the 2 cases until just before death, a time when it is often enough seen in other cardiac lesions. Auricular engorgement was quite absent in one until shortly before death; in the other it was noticed while cardiac failure threatened, and at other times only on exertion. As to murmurs, in the first place the loudness of the murmurs seemed to disguise their true nature in the early part of the case, but a later and perhaps more careful examination might have given more accurate conclusions. In the second case the murmurs were *distinctly loudest* in the mitral area, and, although heard over the tricuspid triangle, there was *no change* in the tone or other indication by which the presystolic murmur heard there could have been ascribed to a tricuspid lesion. 5. In one case the liver was enlarged (markedly nutmeg), and there was no ascites; in the other there was repeated ascites and a small liver, with a thickened Glisson's capsule, and with its substance fatty and atrophied, but not with the advanced nutmeg character. 6. In both cases there was mitral stenosis and an aortic valvular lesion, but in neither case was there aortic stenosis. In both cases there was dilatation of the auricles; in neither case was there any sign of disease of the pulmonary artery or valves, and no deficiency in the region of the foramen ovale. 7. In neither case was there *any* congested condition of the lungs, which were remarkably pale and free from blood.

C. M. Hay ⁵⁹ Sept. 7 reports a case of tricuspid stenosis associated with aortic and mitral lesions. The patient was a woman, 35 years of age, who had been suffering for three months prior to admission from acute mania. There was no oedema, except of the brain and its membrane, nor dropsy other than pericardial. Cardiac dullness was somewhat increased in all directions. The heart's action was

very irregular; no distinct apex-beat could be felt. "A double aortic and a double mitral murmur were heard, but a careful examination was impossible in the case." There was marked cyanosis and, four days before death, jaundice. [It is worthy of mention that the patient was unusually small in stature, which suggests, perhaps, a congenital origin of the heart disease.]

A case of insufficiency of the pulmonary valve is reported by Ernest Dupré, interne at Hôpital Trousseau.¹¹⁸ A girl aged 10 years, of rheumatic heredity, has suffered from two attacks of articular rheumatism and an attack of chorea. She complained of dyspnoea and palpitation. Examination showed slight cardiac enlargement and a systolic thrill in the second space at the left of the sternum. On auscultation a systolic souffle was heard at the apex, and propagated a short distance toward the axilla, but becoming inaudible at the level of the third space. At the second space, at the right border of the sternum, was heard a soft, prolonged, diastolic souffle. Its maximum intensity was in the second space at the left border of the sternum, and it could be distinctly heard along the left border down to the fourth interspace. Pulse regular, rather small, neither bounding nor collapsing. In consultation a unanimous diagnosis of simple pulmonary regurgitation was made. The reporter reviews some half-dozen cases, previously reported, of disease of the pulmonary valves, but in only a few was the diagnosis established by autopsy. His conclusions may be summed up as follows:—

Pathology.—The insufficiency is due to (1) a functional dilatation or (2) an anatomical lesion of the orifice. In the first case the primitive lesion is congenital dilatation of the pulmonary artery and secondary dilatation of the pulmonary orifice, resulting finally, in either case, in dilatation and myocardial degeneration of the right ventricle. In the second class of cases the valvular lesion is almost always the result of acute infection, most commonly puerperal endocarditis, very rarely rheumatic.

Diagnosis.—To be distinguished from aortic insufficiency by the centre of maximum intensity of the murmurs being situated in the second interspaces at the left border of the sternum; character of the pulse; increase of the right ventricle (not of the left); by the absence of the habitual clinical phenomena of aortic regurgitation, facies, vertigo, pulse, etc.

Fowler ² _{Dec. 22, 1888} showed before the London Medical Society "two men, the subjects of aortic stenosis, in whom a peculiar puffing murmur, high in tone, was audible over the trachea." He suggested that the murmur might be cardio-respiratory. Von Basch ⁵⁷ _{Apr. 21} speaks of cardiac dyspnoea, which he has considered from the stand-point of new experiments made by him and Bettelheim, Grossman, Kauders, and Schweinburg. They had found that in dyspnoea excited by mitral insufficiency the intra-thoracic pressure rises, while during dyspnoea due to tricuspid insufficiency it sinks, which is explained by the increase in the amount of blood in the pulmonary vessels in the first instance and its decrease in the second; so that when, during muscular exertion, there is dyspnoea, it is because the left ventricle becomes inadequate to the demands made upon it, and, in consequence of the increased tension in the pulmonary vessels, the interchange of gases in the lungs is abnormally diminished. These results agree with the views of Speck. Cardiac asthma begins with a sudden diminution of the muscular power of the left ventricle. Duroziez, ¹⁷ _{June 4 et seq.} in a communication on the time of the heart-murmurs, insists on the great benefit obtained in doubtful cases by observing the time of the carotid pulse simultaneously with the cardiac sounds, giving instances where otherwise mistakes would apparently have been unavoidable.

Morton Prince ⁹⁹ _{Jan. 31} discusses the occurrence and mechanism of physiological heart-murmurs (endocardial) in healthy individuals. The subjects of the investigation were healthy men, who were candidates for membership in the fire department and were most of them nervously excited at the time of the examination. In 86 consecutive subjects there were 9 cases in which the signs suggested organic heart disease. Of the 77 presumably healthy individuals a "systolic murmur, with all the characteristics of a mitral regurgitant murmur, could be heard in 26 cases." J. H. McCollom had, at the request of the writer, examined 200 presumably healthy men, candidates for the police force, and found 27 with similar murmurs. In most of these cases it was not possible to regard the murmur as cardio-respiratory. In 42 cases the heart's action was recorded. Twenty-nine were above the normal strength; in 19 of these a souffle was present; while among 15 where the heart's action seemed to be of normal strength, in but 1 was a souffle detected. The writer explained the occurrence

of this murmur as follows: "Given a normal healthy sphincter (valve), but with excessive pumping action on the part of the heart under strong nervous excitement, and a temporary leakage may occur from the blood being forced through the sphincter in spite of the action of the latter." It would have been interesting to know of the accentuation or otherwise of the pulmonic second sound, as bearing on the possible intra-ventricular origin of the murmur heard.

Lazarus-Barlow¹⁵ has made a study of capillary pulsation and its diagnostic value in diseases of the heart. He deprecates the ordinary mode of testing for the existence of a capillary pulsation by reddening the forehead by friction, and advocates search for it under the nails, or, still better, upon the mucous membranes. He turns out the lower lip and presses a glass slide over it, when the pulsation, if present, is seen reddening and fading through the glass. Fifty cases of healthy hearts had no capillary pulsation. In 46 cases where capillary pulsation was present 39 had some change in the second aortic sound; 6 showed capillary pulsation on one occasion, and never subsequently; and in 1 case where the pulsation was constantly present no cardiac lesions could be discovered. Of these 39 cases where the second sound of the aorta was affected, 33 presented a diastolic murmur. Bençzur,⁸⁴ _{Apr. 20} considering the value of sphygmographic tracings in heart disease, makes the following conclusions: 1. The anacrotic pulse-curve (*i.e.*, where the up-stroke is broken by one or more second elevations) is characteristic of great exhaustion of the cardiac muscle. 2. In heart disease it is of bad prognosis. 3. In heart disease the anacrotic pulse contra-indicates the employment of Oertl's method. 4. Drugs with a cumulative action, such as digitalis, should be stopped when the anacrotic pulse loses its characteristic form, to be renewed, however, when the anacrotism re-appears. 5. In employing new remedies, their efficiency as cardiac tonics is evinced if the anacrotism disappears under their use. 6. Sphygmographic tracings are valueless as a means of differential diagnosis of the different valvular lesions; but the anacrotic curve furnishes, under some circumstances, indications as to the condition of the myocardium. Sacchi⁶¹ _{Mar. 23} describes a second case of subinguinal venous capillary pulsation. As in the first case (Guicocco), tricuspid insufficiency was present, with a systolic return current into the veins.

Bianchi²⁵ recommends a new method of physical exploration. He introduces a gum-elastic tube through the œsophagus into the stomach, the upper end of the tube terminating in a binaural stethoscope. According to Bianchi, conclusions can be drawn, from the weakness or absence of the respiratory and cardiac sounds, as to the condition of the walls of the œsophagus and stomach, or, on the other hand, as to the functional activity of the thoracic organs. Granville²⁶ remonstrates against drawing conclusions from the results of auscultation when the lung is more or less inflated and the breath held. Germain Sée²⁴ enumerates the causes of slow pulse as follows (Grob): Irritation of the vagus; cardiac atony; intra-cranial pressure. From an etiological standpoint it may be due (1) to functional nervous influences, (2) arterio-sclerosis involving the coronary arteries, (3) fatty heart, (4) valvular lesions, (5) rheumatism, (6) uræmia and cholæmia, and (7) digestive disturbances.

Prognosis in Heart Disease.—Leyden⁶⁹ has presented an admirable consideration of the prognosis of heart disease. In general, he regards the prognosis as more favorable than it was formerly regarded. In reference to sudden death, there are only two forms of heart disease in which it is at all frequent. In most of the chronic cardiac lesions it is a rare occurrence, but aortic regurgitation and true angina pectoris frequently lead to it. In mitral disease, only about 2 per cent. of the cases die suddenly. In a considerable number of cases the length of life is not essentially shortened by the disease.

1. With regard to the more-general conditions: Young children bear heart disease badly, while older children and young adults bear it, on the whole, the best of any individuals, the reason being that in youth the variety of heart disease is apt to be one which has a comparatively favorable prognosis, while older persons have more frequently arterio-sclerosis, which is a more or less progressive disease. On the other hand, age does not impede the development of compensatory changes in case of valvular disease. With advancing age the cardiac muscle gains in volume and power; indeed, the heart is the only organ whose comparative bulk increases with age, and, perhaps, the heart of older persons has even more endurance than that of younger individuals. Sudden death in aortic insufficiency is, at least, equally as frequent in young patients

as in old. 2. As to sex: More women are affected with heart disease than men, but, in general, the prognosis is better in the former than in the latter. Women are not so apt to develop arterio-sclerosis, nor to suffer from angina pectoris, nor to be exposed to such severe strains, nor to indulge in so great excesses as men; and women bear trouble better than the sterner sex; and, finally, they are more apt to have mitral disease with its comparatively favorable prognosis than aortic insufficiency, the reverse being true of men. 3. With regard to manner and circumstances of life: The upper and well-to-do classes, in general, endure heart disease better than the working classes, for they are spared from the necessity of overexertion. Some callings are much more favorable than others; and, again, those who are passionate and reckless do not fare so well as other individuals. Finally, the prognosis is influenced by the effect which drugs produce upon the individual. The more surely and permanently the drugs indicated relieve the symptoms, the more encouraging the prospects of the patient. We should be cautious and moderate in the use of cardiac tonics, such as digitalis, that the patient may have them in reserve when danger really threatens.

The relative prognosis of the different forms of heart disease is considered under three heads: (1) inorganic, (2) myocardial, (3) valvular. 1. Inorganic: The recognition that an individual case is not organic, but functional or nervous in its origin, is by no means always easy, but there are certain factors which go to make up the diagnosis. In the first place, the absence of any physical signs, even upon the most careful examination, both by percussion and auscultation, when the patient is at the same time young, neurasthenic, and particularly if a female. And yet we must bear in mind that in nervous diseases of the heart there may be functional murmurs, or even, as in exophthalmic goitre, cardiac dilatation; while, on the other hand, the myocardium may be gravely affected without objective evidence of the condition. Angina pectoris is of great importance in this connection. There is the form (Heberden) which depends upon disease of the coronary arteries; again, the forms which may be associated with almost all varieties of heart disease; and, finally, the nervous or neurasthenic form of angina. The first and third varieties may be very similar; there may be no physical signs in either case, and yet in one the prognosis

is the opposite of what it is in the other. Elderly persons, particularly men, are more apt to have the organic and dangerous form. Young anaemic female patients are more apt to have the nervous form. Basedow's disease is comparatively favorable, in that the condition may not only be well borne, but may improve. There are also nervous affections of the heart in connection with disease of the spinal marrow. One form the author has described as associated with tabes dorsalis; and conditions of weakness and paralysis of the heart, ending fatally, have been observed in progressive muscular atrophy and bulbar paralysis. 2. With regard to disease of the myocardium: The diagnosis of myocardial disease is, of course, difficult, because the physical signs are so few. There are several different forms of disease which attack the heart-muscle, and hence a general prognosis is extremely difficult to make. We may have, so far as physical signs permit us to distinguish, first, hypertrophy; second, dilatation; and, third, weakness or insufficiency of the heart. These three forms are somewhat sharply distinguished from each other upon physical examination, but yet they occur in combination and in transitional forms. Hypertrophy is no disease, and therefore demands no treatment. It is, however, the expression of a disease, and the more considerable the hypertrophy the more important must be the cause which lies behind it, consideration of which will lead us to the correct diagnosis. Of course, in spite of the presence of hypertrophy, cardiac failure and death may suddenly supervene. Dilatation of heart is most important with regard to prognosis. Although often associated with hypertrophy, it is usually practicable to distinguish it from the latter. The prognosis is less favorable than in hypertrophy, for the condition is due to a stretching of the heart-muscle, to which weakness of the heart will succeed. Two questions arise: first, whether dilatation has in every case the same diagnosis, and, secondly, whether we have means to improve or cure this condition. In the first place we must separate those dilatations which are the result of valvular disease from those which are idiopathic. With regard to the prognosis of cardiac dilatation in general, we may say that dilatation of the right half of the heart is of less serious import than that of the left ventricle. Right-sided dilatation is usually developed in connection with passive congestion of the pulmonary circulation, and may be quickly recovered

from. On the other hand, dilatation of the left ventricle puts the patient's life in danger. And yet certain cases may be completely cured, such as the acutely-developed dilatation seen after acute diseases, which Traube saw in a case of acute rheumatism independent of endocarditis, and which occurs also after measles, scarlet fever, erysipelas, and diphtheria. In the lightest form of this sort the only physical sign is the *bruit de galop*; in others the apex-beat is displaced outward. Of course, it is impossible to say that all such cases are curable or free from danger. Again, the left ventricle may be dilated from overexertion, both with and without the existence of valvular disease, and yet return to its normal size. The prognosis is more difficult to give where the dilatation has slowly developed and is chronic, whether idiopathic (Fraentzel) or the result of aortic insufficiency or chronic nephritis. Here the prognosis depends in each individual case upon the degree of dilatation, the process which has led to it, and the severity of the symptoms resulting from it. Those cases are least favorable of all where the dilatation is the result of a progressive change, like arterio-sclerosis. Any improvement is but temporary. The treatment of dilatation of the left ventricle is a problem which modern therapeutics has yet to solve. Digitalis sometimes gives temporary aid, and the new methods of treatment—by diet and regimen (Oertl), gymnastics (Zander), and hydrotherapy—encourage us to hope for better results in the future. The third form of myocardial disorder, cardiac failure, likewise has a varied etiology. Its symptoms are so evident and easily recognizable that the diagnosis is usually easy. The pulse is small, easily compressible, and either rapid or infrequent. There is general weakness, marked pallor and coolness, a tendency to syncope, vertigo, oppression, and a sense of anxiety. In order to determine whether this dangerous weakness of the heart can be overcome, we must first consider whether the heart has suffered from any organic disease or not. Functional weakness of the heart is, in general, of less significance. Youthful, neurasthenic, and particularly hysterical patients give a better prognosis, particularly if there is a history of similar attacks. The most dangerous form develops acutely in connection with febrile disease. Almost equally dangerous is its sudden occurrence in angina pectoris and in the fatty degeneration of the heart due to anæmia. Among chronic cases we find all sorts of chronic heart

disease with and without attendant valvular lesions. The weakness develops (*a*) when the demand upon the heart has been gradually increased, as in valvular lesions, arterio-sclerosis, nephritis; or (*b*) when the demands upon the heart, being normal, the organ itself is weakened by myocardial disease, anæmia, aleoholic and other poisons of dilatation. The prognosis depends upon the degree of the dilatation and its cause. Progressive diseases, such as arterio-sclerosis and nephritis, are less favorable than conditions due to intoxication or deficiency of nutrition. The treatment of the condition includes not only the exhibition of drugs, but the new methods of gymnastics and of diet combined with exercise, as well as the use of warm baths. With regard to fatty conditions of the heart, there are two forms: first, that seen in obesity; second, that which results from fatty degeneration. The condition associated with obesity, so long as the myocardium is healthy, is comparatively favorable, even when dropsy has developed. Oertl's method is applicable here. Where, however, there are changes in the heart itself, and, in particular, dilatation of the left ventricle, the future is very doubtful, especially if the patient is elderly and is suffering from arterio-sclerosis. Enlargement of the area of dullness toward the right is of much less significance than dilatation of the left ventricle, both because right-sided dilatation is a less-grave condition, and because the fat upon the pericardium often increases the area of dullness in this direction. True fatty degeneration is difficult to make out by physical signs, but it is to be inferred with probability from symptoms of cardiac weakness in ill-nourished and anæmic patients. Cases of simple anæmia or debility are not unfavorable, and therefore to be distinguished from those where there is grave anæmia or cachexia.

In valvular disease the first question is whether there may be complete recovery. This is a matter which has been in discussion since the time of Jaksch (1860). Complete recovery from valvular diseases may occur, particularly in cases of mitral insufficiency. The same possibility exists with regard to aortic regurgitation, but it is seldom fulfilled. Valvular lesions may cause no subjective symptoms, the disease being discovered incidentally. It is wrong to give such a patient a gloomy prognosis, and it is also wrong to let him live like a healthy man. He must avoid such influences as endanger compensation, and particularly undue physical exer-

tion, exposure to cold, the use (abuse) of alcohol, tobacco, and coffee. A man who has heart disease ought not to become a soldier; on the other hand, a soldier with heart disease, particularly if mitral insufficiency, need not in every case abandon his calling. Again, with regard to life-insurance: In England a well-compensated valvular lesion does not apparently exclude the patient from the advantages of life-insurance. The question of marriage is one which should require thought. Men might be harmed by sexual intercourse; women by pregnancy. Often women with heart disease suffer from disturbance of compensation and dropsy during the pregnancy, but return to a favorable condition after delivery. With regard to the length of time during which compensation will probably be maintained in an individual case, we must consider first which valve is diseased; thus, mitral regurgitation gives the best prognosis, aortic regurgitation the worst, although in this latter, as is well known, a lesion due to endocarditis is more favorable than one due to arterio-sclerosis. Again, the less the hypertrophy (or dilatation), the more favorable the prognosis. As to the intensity of the murmurs: a loud and distinct murmur is more favorable than one which is almost inaudible. Finally, the nature of the endocarditic process is of importance. Thus, congenital valvular lesions are completely stationary, and the conditions in valvular lesions following acute diseases, and particularly chorea, are almost equally favorable. Where the lesion is due to rheumatism there is, however, the possibility of a fresh onset of the disease, which is not the case with regard to measles or scarlet fever. The unfavorable prognosis of lesions connected with arterio-sclerosis has already been mentioned. Septic endocarditis has a bad prognosis, although some cases escape alive with more or less valvular defects. Here, again, age, sex, constitution, disposition, and intelligence exert an important influence. Where failure of compensation has occurred the duty of the physician becomes more important. It is too late for prophylaxis, and the patient demands careful and active treatment. We may distinguish (1) mild conditions, (2) such as are associated with dropsy, and (3) those desperate ones where there is obstinate anasarca, great dyspnoea, and passive congestion of the liver and lungs. For these last we can only postpone—we cannot prevent—the catastrophe. In an individual case one factor in the prognosis is the severity of the symptoms; another, the

condition of the heart-muscle, which is to be inferred from the tension and frequency of the pulse, the activity of the kidneys, and the degree of dyspnoea. An important point is the manner in which the disturbance of compensation has occurred, whether with or without special cause, such as the intercurrence of bronchitis, pneumonia, or pregnancy.

With regard to the prognosis of heart-murmurs, the systolic gives the best prognosis, because they are more likely to be functional, and also because the actual lesions which cause systolic murmurs are less unfavorable than those which produce a diastolic murmur. In advanced years anæmic murmurs are less frequent than organic. In elderly persons murmurs at the apex are more likely to be functional than those heard over the aortic valve. Diastolic and presystolic murmurs are, with very few exceptions, of organic origin. In anæmic patients there is sometimes a venous murmur, under the *manubrium sterni*, of a plainly diastolic character. Intermittence of the pulse is seen in health, in fever, in youth, and old age. It is most often dependent upon reflex irritation, due to abdominal disturbance (in children, worms) or to long-persistent psychical disturbance. Variation in the heart-rhythm is, according to the author's experience, usually an individual peculiarity. It occurs often without special cause. Where, however, the disturbance of rhythm is very great (*delirium cordis*), the prognosis is much more unfavorable. Such a disturbance of the heart cannot be long endured. Associated with this we may find on palpation a *tremor cordis*; that is, the contractions of the heart are either so frequent or so irregular, or weak and incomplete, that the hand seems to feel a mere trembling of the heart. It is of evil significance. With regard to alterations of the frequency of the heart's action, either acceleration or infrequency-tachycardia and bradycardia. The first is somewhat grave. It depends on either paralysis or an approach to paralysis of the vagus nerve, whose function is to economize the strength of the heart. In tachycardia the diastole is shortened and the nourishment of the heart impaired. It is impossible to say, however, in any particular case, how long such abnormal frequency can be borne. In general, a rate of more than 120 beats a minute is a grave symptom, and yet there are cases where the pulse has been sustained without permanent injury at the height of 140 to 160 beats for a considerable time. In febrile

states a frequency of more than 120 beats a minute is not in itself a bad omen. This is not the case in pneumonia, and yet the author has lately seen 2 cases recover where the pulse was more than 160. Such a rate in the third stage of meningitis portends death. Paroxysmal tachycardia is not of grave prognosis, and the same may be said of tachycardia occurring during convalescence. An infrequent pulse (bradycardia) is seen less often. It indicates weakness of the heart, and demands the cautious use of stimulants, but usually not of digitalis. It occurs after the use of that drug, and also in angina pectoris. Where the coronary arteries are sclerosed the pulse may fall to 32 or even 24 beats per minute, and it is usually bigeminal, the small beat not being recognizable in the radial artery. A permanent bradycardia is seen, especially in old persons; its prognosis is uncertain. There is a tendency to syncope, and even to sudden death.

Fraentzel⁴ exhibited before the Verein für innere Medicin a patient, aged 23, who had had aortic regurgitation since 1886; and yet, during the year 1887, he pursued the occupation of a carrier of stone without inconvenience, and later that of a rammer in laying down asphalt, compensation being still perfect at this present time.

Prognosis of Mitral Disease in Children.—S. H. Owen⁹⁰ believes that the prognosis is strongly influenced by the conditions under which the mitral murmur occurs for the first time. “The lesions produced by rheumatism are probably much less limited to the mitral valves, are more frequently accompanied with disease of the cardiac muscle, and (which probably never occurs in chorea alone) they are frequently associated with inflammation of the pericardium. I am very strongly of opinion that the mitral affection in chorea, so long as the latter disease is uncomplicated with rheumatism, is almost always slight in degree, and, for the most part, transitory. In a very large number of cases occurring in my experience chorea does become thus complicated, and in such cases the prognosis, as regards the valvular lesion, should, I think, be considerably modified.” On the other hand, an attack of chorea does not seem to aggravate the morbid changes produced in the heart by rheumatism. Even in rheumatic cases the prognosis of heart disease is generally more favorable in children than in adults. Not only scarlatina and measles, but probably all acute infective

processes occurring during childhood tend to injure the heart. Some of the less-hopeful cases of mitral disease have been those in which no history of rheumatism could be obtained, and in which scarlatina or measles alone appear responsible for the primary lesion. The supervention of ulcerative endocarditis upon valvular disease seems to be less frequent in children than in adults, although, as the author confesses, this apparent immunity may be due to the rapid and fatal progress of the disease precluding the development of its characteristic lesions.

Diseases of the respiratory tract and prolonged anaemia exert an unfavorable influence upon the prognosis. Indeed, "it appears highly probable that stenosis of the mitral orifice, which occurs frequently apart from any history of rheumatism, and almost, it might be said, spontaneously, is in some cases indirectly due to this condition of the blood." Stenosis the author regards as more unfavorable than either structural or relative incompetence in its effect upon the duration of life. "In fully-established diseases the sum total of misery and incapacity is, I think, greater in regurgitation, whilst the lethal tendency is probably less than in stenosis," because in stenosis the reserve power is more limited than in cases of insufficiency. Not only do compensatory changes occur more readily in childhood than in adult life, but the heart at this period enjoys comparative immunity from many of the dangers which threaten it in older persons, such as physical strain, severe mental distress, syphilis, and the use of alcohol.

Germain Sée,¹⁰⁰ in discussing valvular lesions without functional disturbance, states that while he has been able to prolong the existence of patients with aortic disease, he has never witnessed a true and *permanent* recovery. In young girls suffering from chlorosis he has frequently seen a presystolic murmur disappear even when the patient has suffered from marked and persistent dyspnoea and œdema of the lower limbs. With regard to mitral insufficiency, he does not regard the organic variety as curable.

M. A. Boyd,¹⁰¹ in an article upon the disappearance of cardiac murmurs, notes that such murmurs as have been produced during acute endocarditis, and afterward disappeared, have all been associated with regurgitation. He reports the case of a young girl, aged 12, who had a pronounced mitral regurgitant murmur. Being examined some years later, all traces of murmur and cardiac

hypertrophy had disappeared, and there was not the slightest dyspnea upon exertion. In 2 cases he has observed the disappearance of aortic regurgitant murmur; one case was that of a young girl in whom the murmur appeared after an attack of acute rheumatism, and continued with symptoms of dilatation and hypertrophy for over two years, when a fresh attack of rheumatism with pericarditis occurred, at the end of which the murmur had disappeared. Now, at the end of several years' time, the patient remains free from cardiac trouble.

Hampeln, of Riga,²¹ June, calls attention to the great importance of etiology in the prognosis of cases of aortic insufficiency, regarding a defect due to endocarditis as of much less serious import than one which is the result of atheroma. G. S. Middleton,²¹³ in speaking of cardiac valvular diseases, said that among his cases of mitral stenosis there were over twenty women who had borne children while suffering from this disease, and that his experience indicated that the common prognosis of pregnancy, under these circumstances, was much too grave. One woman had suffered from mitral stenosis for twenty years, and during that time had borne seven or eight children, and she was now "in pretty much the same condition" as before.

Permanent Slow Pulse.—Huchard³ Sept. is convinced that this symptom originates, in a majority of cases, from a sclerosis of the arteries, and in consequence of a genuine bulbar ischaemia. Often one cannot count more than 28 to 30 beats a minute. Frequently the symptom is accompanied by dizziness, and even by epileptic attacks or attacks of syncope. These patients often become finally afflicted with cardiac troubles or with Bright's disease. The indications for treatment are high, arterial tension, indicated by the radial pulse and the accentuated second aortic sound. Huchard prefers nitro-glycerin, of which he prescribes, once or twice a day, 3 drops of a 1-per-cent. alcoholic solution. This is sometimes given hypodermically. The iodide of potassium or sodium may also be used.

Paroxysmal Tachycardia.—L. Bouveret⁹² Sept. contributes a long article upon idiopathic paroxysmal tachycardia (*tachycardie essentielle paroxystique*). By the term *idiopathic* the author means to indicate that the symptoms are due rather to a functional disorder of the nerves governing the motions of the heart than to any per-

manent lesion either of the heart, the cardiac nerves, or the nervous centres. In the intervals between the paroxysms the function of the heart is normal. Where the attacks are short there is little to be noticed except the extreme rapidity of the heart's action, but if the tachycardia persist for more than four or five days the pulmonic and even the systemic circulation becomes embarrassed. In one case, where a long attack ended in sudden death, the autopsy showed no lesion either of the valves, the myocardium, or the nerves of the heart. The pulse in these attacks rises to 200 or even 300 beats a minute. The attacks may be prolonged for several weeks and even for a month. The heart is acutely dilated. Thoracic symptoms begin, when the attack has exceeded four or five days' duration, with a cough and mucous expectoration, soon tinged with blood. There is dyspnoea and the number of respirations may rise to 40 per minute. Sometimes, besides subcrepitant and sonorous râles, there are to be heard friction sounds and even bronchial respiration, the two last referable either to bronchopneumonia or pulmonary haemorrhage. There are cerebral symptoms ascribable to the circulatory disturbances. Some patients are restless; others have disagreeable dreams or suffer from insomnia throughout the attack; others, still, become delirious. The skin is pale and dry. In one case, however, which ended in a fatal collapse, there was a cold perspiration on the face and extremities. When the attack takes a favorable termination perspiration is re-established. The temperature is always normal in a short attack, but in the longer ones may rise 1° to 3° C. (1.8° to 5.4° F.) above normal. Of 11 cases of prolonged attack 4 terminated fatally from cardiac failure. A favorable termination of the prolonged paroxysm often occurs suddenly. After two or three slight and energetic contractions of the heart the pulse falls from 200 or 250 to 60 or 70 beats a minute. At the time of this change many persons experience peculiar sensations. One feels as if he were going to die; another believes that something has burst in the cervical region. During the first days of convalescence the heart is still easily excited. Generally, weakness persists for some days or weeks, according to the duration of the paroxysm and the intensity of the symptoms to which it gives rise. The duration of the disease is long and quite indeterminate. The patients whose cases he has collected have suffered three, five, ten and even fifteen years. With

regard to those who still live there is no indication of complete cure ; it is rather more probable than otherwise that they will have fresh attacks. While the paroxysms do not leave behind them any permanent lesion, yet each attack weakens the vigor of the heart, and the paroxysms tend to become more frequent, the symptoms of circulatory disturbance disappear more slowly, and the general prostration persists for a longer time after the palpitation has ended. The disease is a severe one. Of 12 patients 1 alone can be considered as cured. He had two attacks very near together, and several years have now elapsed without a fresh paroxysm. Four patients have died. Of the 7 survivors none are really well. With regard to etiology, no cases have been observed in children. The patients have varied in age from 19 to 52. Of all the causes to which the development of the disease might be attributed, the author regards overexertion, whether physical or mental, as the most important. The disease may be regarded as one affecting that part of the centres and branches of the pneumogastric which regulates the action of the heart.

Treatment.—If anæmia exists it should be corrected by tonics, hygiene, and food. It is also advisable to remove any digestive disturbance which may be present, and the patient should be warned against overexertion. Tea, coffee, and tobacco are contra-indicated. During the paroxysm rest in bed is desirable ; at any rate, exertion should be avoided. Digitalis has proved disappointing in 2 cases ; in 5 others it seemed to be of some advantage. Caffeine, nitrite of amyl, and nitro-glycerin proved unavailing. As Czermak has shown, compression of the pneumogastric in the neck slows the beating of the heart. Pressure should be made at the level of the thyroid cartilage ; and, so far as possible, we should avoid compressing the carotid artery, behind which the pneumogastric lies. A patient of Nothnagel's, where the tachycardia was associated with a valvular lesion, was able to cut short his attacks by making profound inspirations. Another patient was able to delay the beginning of a paroxysm by holding his breath after a full inspiration ; but the attack occurred, although delayed. Bristow obtained relief for a patient by moderate inhalations of chloroform, and a huge mustard solution over the praecordial region gave the same patient relief from his oppression and dyspnoea. The subcutaneous use of morphine has seemed

advantageous to the author in calming the patient and moderating his discomfort, but not in shortening the attacks. In 2 cases leeches applied over the heart relieved the signs of pulmonary stasis. In conclusion, the only efficacious treatment of the paroxysm seems to be the compression of the pneumogastric in the cervical region; but this treatment has been applied but three times, and its value cannot be regarded as wholly settled.

Kisch,⁵⁷ in discussing abnormal rhythm of the heart in cases of obesity, expresses the opinion that, so far as regards prognosis, intermittence of the heart-beat, if it is not frequent, and if the pulse-waves are otherwise plainly regular, is not so unfavorable as irregularity of the pulse, which, if extreme (delirium cordis), is of very grave significance. Leyden,¹¹⁴ in a *résumé* of a volume of lectures on "Idiopathic Enlargements of the Heart," by Fraentzel,¹¹⁵ mentions that the author refers the high tension in albuminuria to the direct action of a ptomaine. Where there has been a well-marked disturbance of compensation with asthma, Fraentzel has found most relief from subcutaneous injection of morphine associated with the exhibition of digitalis and other stimulants. With regard to the cases of heart overstrain seen in soldiers and the like, Fraentzel believes that in some cases congenital narrowing of the aorta may be an etiological factor. As instances of enlargement of the heart where the arterial pressure and the myocardium are normal, Fraentzel names exophthalmic goitre and diseases resulting from the abuse of alcohol and tobacco; also paroxysmal tachycardia and palpitation following great mental excitement.

Tangl²⁰ has published a prize essay on the "Hypertrophy and the Physiological Growth of the Heart," of which the conclusions are as follow: In embryonic life, and for a time after birth, the heart grows by increase in size and by division of the muscle-cells. Later, the growth of the heart depends essentially upon the enlargement of the muscle-cells alone. In hypertrophy of the heart, produced by artificial lesions of the aortic valves, he finds that dilatation of the left ventricle always precedes the hypertrophy, that hypertrophy may develop even when the general nutrition of the body is very unfavorable, and that in hypertrophy the increase of the weight of the heart and of the transverse diameter of the muscle-cells is proportional.

Bouveret and Chabalier²¹¹ discuss the theory of the *bruit de galop* in cardiac hypertrophy of renal origin. Their conclusion, from the study of cardiograms, is that the adventitious sound heard, and likewise the adventitious shock, are systolic, and perhaps due to a repeated closure of the mitral valve.

E. A. Pease⁹⁹ has examined the subject of the voluntary control of the heart, and made observations upon a healthy vigorous man who possesses this power. His conclusion in the case under observation was that the power of the subject to accelerate his heart-beat "was due simply and purely to an effort of the will directed upon the regulating mechanism of the heart."

ARTERIO-SCLEROSIS OF THE HEART.

Gingeot³⁵ _{Dec. 13, 1888} gives a summary of the recent advances which have been made in the study of this condition, especially through the labors of Huchard and Weber. Arterio-sclerosis is a process which affects eventually not only the peripheral vessels, but also those through which the heart is itself nourished, and finally involves the sclerosis of the myocardium, and shows itself by special symptoms. Sclerosis of the myocardium, whether engendered by an intoxication (alcohol, tobacco, malaria, lead), by a diathesis (rheumatic, gouty, syphilitic), or by excesses (physical, moral, intellectual), which all tend to raise arterial tension, presents three distinct varieties: (1) dystrophic, (2) inflammatory, (3) mixed. The first two are easily distinguished. Dystrophic sclerosis begins, in each vascular territory, as far as possible from the corresponding artery. The disease extends centripetally so that those muscular fibres are the more slowly involved which lie farther from the vessels whose permeability is compromised. In inflammatory sclerosis, on the contrary, the inflammation is primarily a periarteritis, and is thus propagated to the myocardium by centrifugal extension. The mixed form is a combination of both, its initial lesion being endo-periarteritis instead of endarteritis alone (dystrophic variety) or periarteritis (inflammatory variety). The clinical ideal would be to be able to attribute to each of the above varieties so distinct a symptomatology that a differential diagnosis can be derived which will permit the classifications of patients while alive with as much accuracy as by autopsy. We can never reach this perfection because, in reality, the lesions which are described as isolated, in

order to put them in a stronger light, are not found in nature in such simplicity. Myocardial sclerosis is only one of the localizations of disseminated arterio-sclerosis which is found conjointly with analogous conditions in other organs besides the heart. Cardiac sclerosis is preceded by a latent period the symptoms of which, according to Huchard and Weber, are a firm, small pulse, with a sudden rise and rapid fall; a state of arterial tension exaggerated in consequence of an intermittent or permanent spasm of the peripheral arteries, which often causes pallor of the face and integuments, local anaemia, and sensation of coldness wrongly attributed to the condition of the kidneys; polyuria, palpitation at night or during digestion, disturbed cardiac rhythm, and tachycardia; rapid pulse, pulsation of arteries, physical and intellectual fatigue, cerebral sensations of lightness and vertigo, strong cardiac pulsation over an increased area, signs of cardiac hypertrophy. Huchard has pointed out the frequency of permanent or temporary smallness of the left radial pulse, and insists on the importance of the accentuated second aortic sound. At length, the cardiac lesion plainly manifests itself. The phenomena are not always the same, but several symptomatic forms may be distinguished. Huchard distinguishes five types symptomatically of arterio-cardiac disease: 1. *Pulmonary*, often marked by violent attacks of cardiac asthma, feeling of oppression in chest and weight in epigastrium, dyspncea without albuminuria. 2. *Painful* type, simulating angina pectoris. 3. *Arythmic* type, with two subdivisions: (a) cases marked by sudden violent disturbance, called "*folie de cœur*" (insanity of the heart); (b) a permanent but insidious arrhythmia without symptoms, often discovered by accident. 4. *Tachycardiae* type, transitory or permanent, pulse ranging from 150 to 220 beats a minute. 5. *Asystolic* type, the most important, a result of acute dilatation of the left ventricle.

Huchard recognizes three successive stages of the arterio-cardiac sclerosis: (a) pre-arterial, increased arterial tension without vascular lesion; (b) cardio-arterial, vascular endarteritis, at first peripheral, then visceral and myocardial, always associated with increased arterial tension; (c) mitro-arterial, dilatation of cardiac cavities, auriculo-ventricular orifices, and, above all, lowering of arterial tension.

While the asystolic condition of valvular origin is slowly and

progressively developed, and its course measured by gradual peripheral œdema, visceral congestions, diminished amount of urine, and all the signs of cardiac weakness; on the other hand, arterio-cardiac asystole is marked by a sudden, unexpected, acute onset. A sudden spasm of the vessels causes increased resistance, and demands of the degenerated heart a corresponding muscular force which it does not possess. Slight fatigue, simple bronchitis, or some scarcely appreciable cause precipitates a condition of frightful dyspnœa, cyanosis, and feeble pulse. These attacks may be repeated at intervals of several hours or several months. They finally bring on œdema, diminished urine, albuminuria, permanent asystole,—a condition which is easily mistaken for valvular disease, in which the souffle is not heard owing to the weakness of the cardiac contractions. Prognosis depends on the type and intensity of the symptoms and the complications. The chief therapeutic guide is the condition of arterial tension. For increased tension, iodides, nitrites, blood-letting. Digitalis is contra-indicated. In lowered tension, digitalis.

Huchard¹⁸⁸ describes the asystolic or, better, cardiectatic form of arterio-sclerosis of the heart. This is the most important variety of arterio-sclerosis and has the gravest prognosis. The sudden, unexpected, frequent attacks of asystole which supervene in the course of cardio-arterial disease present distinct courses which are not met with, to the same extent and in the same form, in cases of simple valvular disease. In the latter we can almost foresee the course of the disease, and the myocardial insufficiency, progressively increasing, is measured by peripheral œdema and repeated congestions, which invade, in turn, the viscera and tissues by scarcity of urine, diminished praecordial shock, and all the signs of cardiac weakness. In cardiac disease of vascular origin, on the contrary, the most-marked asystole appears suddenly. It may, as in valvular affections, be accompanied by œdema, anasarca, or passive hyperæmia. But from the beginning it may also run its course without œdema or congestions. It is asystole in the true sense, because the heart alone appears affected and undergoes acute dilatation, for which the insidious and latent lesions of the cardiac muscle have long prepared the way. In the first case, vascular weakness and progressive enfeeblement of the contractility of the vessels advance simultaneously with progressive insufficiency of the

myocardium, and it is, in reality, a cardio-vascular weakness. In the second case, on the contrary, it is the exaggerated vascular contractility which predominates, and constitutes the principal danger by suddenly augmenting the peripheral resistance and imposing on the heart excessive work, to which it succumbs because of its already altered structural elements. Hitherto the heart has sufficed for moderate work, but the time arrives when, for a cause still unknown, but without doubt due to the irritation of the sclerotic process in the arterioles, the latter contract and cause acute dilatation of the heart. In such cases vaso-dilators and depressors of arterial tension are indicated, and often free venesection, which may be followed by almost marvelous results.

Two years ago Huchard saw an interesting case in point, of a woman in whom arterio-sclerosis of the heart was first manifested by several attacks of arrhythmia and pulmonary congestion. "One day an attack of cardiac asthma appeared and I saw her in frightful dyspnoea: purple lips, cold extremities, cyanosed fingers; the heart much dilated, giving on palpation a sensation of diffused tremor or fluttering; pulse feeble, small, fluttering on the left side; the voice interrupted, orthopnoea, threatening of instant asphyxia." In consultation with Potain, she was at once bled to the extent of 400 grams (12 ounces 7 drachms). In half an hour there was great relief and the asphyctic condition had disappeared. Several smaller relapses were relieved in the same way. She died five months after of cerebral complications.

Huchard also saw with Lefèvre an instructive case of the asystolic form of cardiac arterio-sclerosis. Woman, aged 52 years, complaining for two years of palpitation and dyspnoea on the slightest effort, and at times of moderate pain under the sternum. The pulse was then regular and strong, but a little vibratory, and he observed several periods of disturbed rhythm which finally disappeared. The cardiac pulsation was strong. In 1883 the cata-menia ceased after several attacks of menorrhagia. In 1886 palpitation increased; dyspnoea re-appeared, but no abnormal cardiac sounds were heard; there was no œdema and no albumen in the urine. At the beginning of May, 1887, after a somewhat fatiguing voyage to England, an asystolic crisis appeared. In a few days she was able to return to France, though suffering with constant dyspnoea and irregular pulse. June 7th she was seized with

severe dyspnœa; tumultuous beating of the heart; pulse small, irregular, frequent, almost uncountable. The attacks were repeated daily; dyspnœa became constant; œdema of the lower limbs appeared; urine small in amount and showed traces of albumen. Marked improvement followed a bleeding of 300 grams (9 ounces 7 drachms). The area of cardiac dullness was increased considerably, the aortic second sound was accentuated, and there was a slight degree of aortic dilatation. Eight days later the albumen increased in the urine, and the patient died in uræmic coma. The author also reports a second very similar case of much shorter duration—eight days. These myocardial lesions are very common in old people, and are the cause of the great mortality of pneumonia in old age. In such cases cardiac tonics, digitalis, and caffeine are indicated from the outset.

The painful and asystolic types of sclerosis are associated with ischæmic lesions; the painful, rhythmic, and dyspnoeic types with cardio-renal or cardio-aortic lesions. But it is still premature to assign distinct clinical forms to particular varieties of arterio-sclerosis of the heart, especially since periarteritis and endarteritis of the coronary arteries are often associated. Sometimes at autopsies extensive diseases of the cardiac muscular fibres is found, which during life had given rise to no marked symptoms. In other cases apparently insignificant lesions had caused grave symptoms. These discrepancies may be explained by the existence in the heart, as in the brain, of regions *tolerant* or indifferent in regard to destructive lesions and of other *intolerant* regions, the latter depending on the importance and the absence of anastomosis with an obliterated artery, and also depending on the function of the affected muscular fibres. The intolerant regions are especially the papillary muscles and the fibres in contact with the ganglia and the interventricular septum,—particularly the last, because on it depends the harmonious working of the two ventricles. In a case recently seen in his service, of asystolic symptoms with considerable œdema of the lower limbs and multiple transudations, the sole pathological lesion was myocarditis of the interventricular septum. In such cases the præcordial pulsations maintain their strength and the pulse continues strong up to the approach of death. The permanent arhythmic type and certain cases of asystole of nervous origin may doubtless be attributed to lesions of the

cardiac ganglia which are capable of modifying the cardiac rhythm. The lesions of these ganglia are as yet but little understood. But it is not necessary in all cases to appeal to a disturbance of the cardiac ganglia or nerves to explain disturbances of cardiac rhythm, for rhythmical contraction is a property inherent in the myocardium, as physiology has demonstrated, and is not absolutely dependent on the nervous system. Therefore a simple lesion of the cardiac muscle is capable of producing by itself all the symptoms of disturbed rhythm. Finally, we must not forget the principal factor in producing the lesions of sclerosis of the myocardium is sclerosis of the coronary arteries, with or without stenosis of these vessels. Numerous experiments have demonstrated that the result of closure of these arteries is disturbed rhythm, wild palpitation, angina, and rapid and definite weakening of the myocardium.

Cardiac Failure and Sudden Death.—J. A. McWilliam^{2,5} offers an explanation of certain cases of sudden death from cardiac failure without marked lesions. The organic lesions most commonly associated with sudden cardiac failure are well known, namely, fatty or fibroid degeneration of the muscular walls, aortic regurgitation, and diseased conditions of the coronary arteries; but sudden stoppage of the heart's action has often been observed apart from the occurrence of gross structural lesions. Not infrequently the cardiac substance has exhibited no pronounced morbid change. Sudden cardiac failure is usually assumed to take the form of quiescent stand-still in a state of diastole. A long series of experiments on the mammalian heart has convinced the author that, in ordinary circumstances, sudden cardiac failure does not usually take the form of simple ventricular stand-still in diastole. It assumes, on the contrary, the form of violent, though irregular and inco-ordinated, manifestation of ventricular energy. Instead of quiescence, there is a tumultuous activity, irregular in character and wholly ineffective as regards its results. The ventricles become distended with blood, as the rapid quivering movement of their walls is wholly insufficient to expel their contents. The name of *delirium cordis* has been applied to this condition. This fibrillar mode of contraction may be induced with the greatest ease; gentle handling of the organ, slight friction of the ventricular surface, or a mere touch of the finger may be followed by the immediate manifestation of this remarkable form of inco-ordinated action.

Any condition involving a more or less marked disturbance of the normal nutrition of the cardiac tissues favors the development of delirium cordis. This phenomena has been observed in all warm-blooded animals, and in the higher mammals is almost invariably fatal. It is therefore in the highest degree probable that a similar phenomenon occurs in the human heart, and that it is the mode of cardiac failure and the direct and immediate cause of death in many cases of sudden dissolution, especially those cases of fatal heart-stoppage which occur even under favorable conditions,—for example, during periods of inaction, or even during sleep, and where the heart had previously been doing its work sufficiently well to enable its possessor to discharge all the duties of a fairly active though not laborious life.

Failure of the Heart from Overstrain.—Roy and J. G. Adams² made a series of experiments on dogs to ascertain the effect upon the heart of variations in the work which it is called upon to perform in conditions of health and disease. 1. Changes in the blood-pressure: These were produced by narrowing the aorta or its branches. To measure the increased resistance against which the heart has to empty its contents, the intra-ventricular pressure was recorded by a pressure-gauge. The normal pressure in the left ventricle, which, in the dog, is something under 130 millimetres (5.12 inches) mercurial pressure, can, by gradual narrowing of the ascending aorta, be raised to 250 millimetres (10 inches), 300 millimetres (11.82 inches), or even a little more in certain cases. Beyond a certain point, further narrowing or even closure of the aorta does not raise the intra-ventricular pressure beyond the limit above referred to. With fatigue of the heart, produced either by continued slight narrowing or often-repeated great narrowing, this maximum limit gradually falls. Such narrowing of the aorta produces a very evident distention of both ventricles, which, nevertheless, go on contracting and expanding in an apparently perfectly normal manner. This narrowing of the aorta, however, produces regurgitation through both mitral and tricuspid valves, and in the large veins there is a very visible wave proceeding from the heart with each ventricular systole. 2. Changes in the amount of blood expelled: An instrument was devised by which both the amount of blood thrown out of the heart in a given time and the effect on the heart itself of variations in that volume could

be measured. Thus, it was found that the quantity of blood thrown out by the heart in a given time is liable to very great variations independently of the arterial blood-pressure.

First, the effect on the heart of changes of pressure within the arteries: Rise of arterial pressure produced by narrowing the descending aorta does not change the amount of blood thrown out by the heart during the period of raised blood-pressure as compared with that before or after the period of narrowing. The heart itself, however, is appreciably affected by such change in the blood-pressure. Its size at the end of systole is greater than with normal arterial pressure; that is, there is not so complete an expulsion of blood, while at the same time its expansion during diastole is also greater. The expansion of the heart leads, if extreme, to functional incompetence of the auriculo-ventricular valves, an effect which is all the more readily produced the more fatigued the heart is. The quantity of blood within the vascular system influences greatly the volume of blood which the heart has to expel in a given time. In one experiment injections of 50 cubic centimetres (1.69 fluidounces) of salt solution produced an increase in the mechanical work done by the heart equal to about 34 per cent. Narrowing of the veins has the same effect as increasing the volume of blood in the vascular system. When the rapidity and force of beat remain constant, any increase in the amount of blood which reaches the heart must necessarily increase the diastolic expansion of the organ. We have no reason to believe that, with an increased degree of expansion in diastole, more energy is expended in throwing out a given volume of blood against a given arterial pressure. Contrary to what is generally asserted, the ventricle is not completely emptied of blood at the end of each contraction, but there remains a varying amount of residual blood. At each contraction the lower part of the ventricular cavity closes completely, the papillary muscles coming into contact with one another; the upper part of the cavity, however, lying between the valves and the papillary muscles, does not become emptied.

Increase of the work done produces diminished completeness of contraction in systole, and, therefore, an increase in the residual blood in the ventricle. This physiological dilatation of the heart with increased work becomes, when excessive, the cause of failure of the organ from overwork or overstrain. In other words, the

heart goes on contracting and sending out all the blood which reaches it (except, of course, the residual blood) until the moment when, either from increase in the arterial pressure or from weakness of the heart-muscle, the muscles at the base of the ventricles no longer narrow the auriculo-ventricular orifices during systole to a degree which permits of these orifices being closed by their valves, and cardiac failure results. 3. Affections of the valves from overstrain: In nearly every case of artificially produced overstrain certain portions of both the aortic and mitral as well as the tricuspid valves are the seat of edematous thickening. In the aortic valves this thickening is most marked along the line of insertion of the flaps; in the mitral and tricuspid valves the thickening is situated chiefly along those parts of the flaps which are normally in apposition during systole. It is in the same places that thickening takes place by formation of fibrous tissue in such diseases as chronic Bright's or syphilis, with secondary hypertrophy and valvular disease of the heart. Very commonly, also, a dullness of certain parts of the endocardial covering of the valves indicated a shedding of the endothelium. In all cases there were punctiform ecchymoses along the same parts of the mitral flaps.

ANGINA PECTORIS.

Potain,³ in discussing a case of angina, says there are many varieties of this disease. Some are neuroses; others are neuralgic or related to affections of the cardiac plexus. These neuralgic cases may be primitive or symptomatic of an affection of the heart or of the large vessels. Others are sympathetic. Finally, the most important of all is that class which is associated with defective circulation in the heart due to stenosis of the coronary arteries. There are cases of angina which do not depend on stenosis of the coronary arteries, as the autopsy shows. But the author had never known a case of death due to angina pectoris which did not present stenosis of the coronary arteries. On the other hand, he had never found a case of marked stenosis of both coronary arteries in which, during life, there were not attacks of angina. In cases where the nervous plexus of the heart is primarily affected, death never occurs from the angina itself. In cases of stenosis of the coronary arteries the nutrition of the heart is not affected, but its functional activity. During unusual exertion a corresponding

increase in the blood-supply of the heart is demanded, but, as this supply is limited by the stenosis of the coronary arteries, a local asphyxia of the cardiac muscle supervenes, resulting in angina pectoris. In a few minutes, the circulation being restored by rest, the cardiac muscle regains the normal condition. Other conditions which favor the occurrence of the paroxysms are difficult digestion, overeating, emotional causes, etc. Neuralgic cases of angina may be associated with rheumatism or gout, but are far less frequent. The attacks of angina come on suddenly, often at night, with agonizing substernal pain propagated into the left arm. The attacks come without apparent cause, and, after lasting half an hour to three hours or more, cease spontaneously. The attacks recur irregularly, but during the intervals the patient is able to run or undertake any exertion without provoking attacks of angina or anything more than slight dyspnoea. In such cases there is no danger to life. In other cases there is neuritis of the cardiac plexus, more or less closely allied to an aortic affection. There is then a continuous substernal pain, increasing at times to paroxysms, but never absent in the intervals. Signs of aortic disease will be found in these cases. Peter reports a case of ruptured heart due to obliteration of the coronary artery. Death did not occur until twelve days after the perforation. In spite of the obliteration of the coronaries, there had been no symptoms of angina pectoris.

Mollière⁸² _{Sept. 14} reports a case of angina pectoris where there was found, post-mortem, carcinoma of the mesenteric and prevertebral ganglia, involving the cœliac plexus. There were secondary carcinomatous nodules in the lungs, but the bronchial and pulmonary ganglia were not involved, and the author suggests the possibility that the angina pectoris in this case was caused by irritation of the sympathetic in the abdomen. Budor,¹⁵ _{Apr.} in his observation with regard to the effect of obliteration of the coronary arteries on the nutrition of the cardiac walls, found that in about one-fourth of the cases there are supplemental coronary arteries, which run mostly in the upper part of the ventricles, the collateral circulation in which may sometimes prevent myocardial degeneration. Adolph Ott³¹⁹ _{Apr. 18} has made an important study of the normal and pathological relations of the cardiac ganglia in men. Thirty hearts were examined, and the lesions of the ganglia were divided into two classes—first, a progressive (chronic) change, and, secondly, an acute paren-

chymatous degeneration of the ganglion-cells. From a clinical stand-point, the author finds no means of judging during life about the pathological condition of the heart ganglia; nor does he recognize that their changes influence the heart's action either in frequency or in rhythm.

Diagnosis.—Huchard⁷³ gives the following table of differential diagnosis between true angina and hysterical pseudo-angina:—

<i>True Angina.</i>	<i>Hysterical Pseudo-Angina.</i>
Most common at age of 40 or 50 years.	At every age, even 6 years.
Most common in men. Attacks brought on by exertion.	Most common in women. Attacks spontaneous.
Attacks rarely periodical or nocturnal.	Often periodical and nocturnal.
Not associated with other symptoms.	Associated with nervous symptoms.
Vasomotor form rare. Agonizing pain and sensation of compression by a vise.	Vasomotor form common. Pain less severe; sensation of distension.
Pain of short duration. Attitude: silence, immobility.	Pain lasts one or two hours. Agitation and activity.
Lesion: sclerosis of coronary artery.	Neuralgia of nerves and cardio-plexus.
Prognosis grave, often fatal.	Never fatal.
Arterial medication.	Antineuralgic medication.

Prognosis in Angina.—Huchard¹⁰⁰ discusses the prognosis of angina. The termination of true angina peitoris, if left to itself, is almost always fatal. Sudden death may occur during the course or at the end of a painful paroxysm, or, again, by sudden syncope unattended with pain. Angina is an affection eminently liable to syncope,—the patient falls as though struck by lightning. In other cases death is not sudden but rapid, and may be attended with symptoms of asphyxia instead of syncope. A lesion of the right coronary artery more commonly gives rise to respiratory and asphyctic accidents. Death may occur slowly with the symptoms of asystole in cases where arterio-sclerosis, involving the coronary artery and cutting off part of the blood-supply, at length causes trophic and inflammatory changes in the muscular fibre. These are followed by dilatation of the cavities and of the auriculo-ventricular orifices. In other cases the disease is terminated by intercurrent affections. The importance which is to be assigned to lesions of the cardiac ganglia is not yet determined. In a few cases chronic neuritis has been found, and pigmentary and granular degeneration of the nerve-cells. The predisposing causes of

sudden arrest of the heart in angina pectoris are probably lesions of the cardiac ganglia and local ischaemia of the myocardium; the exciting causes are spasmodic contraction or thrombosis of the coronary arteries. The termination is not necessarily fatal. Spontaneous cure occurs in 5 to 10 per cent. of all cases, as is proved by cases reported by Heberden, Fothergill, Hoffman, and Gintac. Older authors confounded true angina with pseudo-angina, and also reported cures where there were only remissions. Cases have existed twenty-five years or longer, in the course of which remissions have occurred lasting two or three years, and have been mistaken for cures. Though spontaneous cure is rare and even exceptional, it occurs in the great majority of cases which are submitted to rational treatment.

Treatment.—Huchard claims to have demonstrated that true angina pectoris and arterio-sclerosis of the heart can be cured by iodide of potash. The drug is given at least three or four years in doses of from forty-five to sixty grains (2.90 to 3.90 grammes) daily, taking care to suspend it for eight or ten days each month. In rheumatic cases, sodium salicylate; some cases demand local or general revulsion, blisters, massage, and sulphur-baths. Rest, even temperature, and alimentary hygiene are always important.

RUPTURE OF THE HEART.

Meyer⁹ reports 9 cases of rupture of the heart, and analyzes 25 cases which have been recorded in the literature since 1870. Of the 12,000 to 13,000 autopsies made at the Munich Institute since 1854, there have been only 7 cases of this rare condition. Rupture is invariably the result of some prior changes in the cardiac muscle. In several cases there was a new growth in the cardiac wall, in 1 case an echinococcus cyst, and occasionally ulcerative endocarditis, when mural, will cause perforation. The great majority of cases depend on two conditions—myocarditis and fatty degeneration. Myocarditis is usually the result of a lesion of a branch of the coronary artery, either an acute endarteritis, such as may occur in the specific fevers, or a chronic sclerosis of the vessel, which leads to a fibroid condition of the muscle. Local disturbances of nutrition caused by the blocking of a terminal branch of a coronary artery result in anaemic necrosis and softening. If rupture does not take place during this period, the softened tissue is in time transformed

into fibrous tissue, which often yields, causing aneurism and rupture. In fatty degeneration an extreme grade may be reached without danger of rupture so long as the process is uniform. A local fatty change, which follows the gradual obliteration by endarteritis of a branch supplying a limited area of the cardiac wall, seems to precede rupture in a number of cases. The relation of heart rupture to arterio-sclerosis is shown by the fact that in the majority of cases the patients are advanced in life.

In Meyer's cases, in 25 the rupture was of the left ventricle, 7 of the right ventricle, and 4 of the right auricle. The apex of the left ventricle is usually the site of the laceration, probably because it is in the long branch of the left coronary artery, which supplies this region, that the most frequent atheromatous degeneration is found. Moreover, at the point of the left ventricle the muscular layers are thin. The rupture is not necessarily followed by immediate death. In some cases the symptoms have persisted for hours, or even days, probably owing to the fact that a small laceration had occurred and gradually extended. The determining cause is often severe muscular exertion, and emotional causes, in reality, have little influence. In a number of cases death occurs suddenly without premonition.

CARDIAC SYPHILIS.

Feulard ³⁴⁵_{Aug.} is able to collect but 20 authentic recorded cases of cardiac gummatæ. Their existence is a matter of extreme gravity, and sometimes occasions sudden death as its first and only symptom, while in other instances there are the ordinary manifestations of cardiac failure, particularly severe palpitation and dyspnoæa. He cites 2 cases of gumma of the pericardium, and finally 2 cases of cardiac gumma in infants. Mauriac ³_{Mar. 22} also discusses syphilis of the heart. He places the number of authentic cases at about 25 or 30, among which the two sexes are equally represented. In 22 cases there were 8 between 20 and 30 years old, 13 between 30 and 50, and 1 of 60. The disease may attack separately or simultaneously all the parts of the heart, the pericardium, the endocardium, the valves, and most frequently the muscular tissue. In most cases the orifices and valves remain untouched. As for the physical signs, they may be summed up as follows: more or less increase of praecordial dullness and a muffling of the heart-sounds, which may or may not be accompanied by a slight blowing

murmur, for which last it is always difficult to determine either its organic cause or its location. It is precisely "this obscurity in the physical signs which is peculiar to myocardial disease." When we have well-marked signs of an affection of the valves or orifices of the heart, we are, to a certain extent, justified in excluding syphilis. The prognosis is exceedingly grave. Sudden death occurred in 15 out of 30 cases. Treatment consists in the administration of iodide of potassium, tonics, and stimulants. T. J. Lang, of Vienna,¹¹⁵⁵; _{June 15}⁶ says that endocarditis is very rare except in association with myocarditis. Many cases terminate suddenly without any previous symptoms, but where the course is more prolonged the symptoms may be those of cardiac failure and dilatation. The diagnosis is only to be approximately made in cases with a marked syphilitic history, without evidence of alcoholism or of fatty degeneration. The prognosis is most unfavorable, but cases of "healed lesions" have been reported. Lang's table of 44 cases shows a majority to have occurred between the ages of 28 and 37 years.

NEW GROWTHS.

Redtenbacher _{Mar. 14}⁸ reports a case of primary angio-sarcoma of the pericardium occurring in a tailor 22 years old. Sonnenschein _{June 27}⁸ reports a case of myxo-chondro-sarcoma of the tricuspid valve, secondary to a chondro-sarcoma of the femur, in a girl of 19. Caryophyllis _{Mar.}⁵ reports a case of fibro-lipoma seated on the right auricle in a woman of 66 years. Martin Durr _{Feb.}⁷ reports a hydatid cyst occurring in the wall of the left ventricle in a man of 37. In reviewing the literature of the subject he finds but 30 cases reported, mostly by German and English observers. T. W. Zahn _{Jan.}²⁰ reports 2 cases of phlebectasis situated, respectively, in the right ventricle and upon one of the pulmonary valves.

Mariani _{Apr.}¹³ reports the finding of a tuberculous cavity in the wall of the heart without evidence of tubercle elsewhere in the body, and without especial symptoms during life. Guttmann _{Dec. 10, '78}⁴¹ reports a case of melano-sarcoma of the heart secondary to a similar tumor in the right eye, which developed no less than thirty years before the heart trouble, the point of interest being the long period of latency between the growth of the original tumor and the occurrence of metastasis. Monroe Smith _{Jan.}² exhibited before the Bristol Medico-Chirurgical Society for Shaw a heart containing

numerous cysts varying in size from a pin's head to a walnut, with slate-colored, fatty contents, and protruding from between the columnæ carneæ of both ventricles. The explanation offered was that these tumors were blood-cysts with degenerated contents and organized walls. H. P. Loomis^{Jan. 19}¹ reported a case of cardiac abscesses in a patient who had died of pneumonia. The heart presented two small abscesses. It was possible that the origin of the suppuration was disease of the ovaries, which was present, and it was also suggested that it was a gummatous process; or, again, that the abscesses were due to infection by the bacillus of pneumonia. Dittrich^{Apr. 16}⁵⁹ reports a case of acute miliary tuberculosis where tuberculous lymphatic glands adhering to the posterior wall of the ascending aorta had infected the aorta itself, which, in turn, had become the source of the general infection of the body.

FOREIGN BODIES.

Meachem^{Feb. 2}⁶¹ reports the removal of a needle $1\frac{1}{2}$ inches (37 millimetres) long from a little hardened elevation which pulsated with the heart, and was so situated that the author felt sure it had for a time found a resting-place in the very substance of the heart itself. Severe pain and palpitation had been complained of for many weeks, along with a sense of indescribable oppression about the chest; in a week or two the patient was as well as ever. George L. Peabody^{Dec. 29, '88}¹ exhibited before the Association of American Physicians the heart of a woman, 29 years of age, in which a pin, the top of the head of which was free in the left ventricle, was seen piercing one of the papillary muscles attached to the anterior segment of the mitral valve, and punctured the wall of the ventricle obliquely to the depth of 3 centimetres (1.18 inches). The point of the pin was distant 5 millimetres (0.20 inch) from the external surface of the heart. The pin had evidently been in its present situation a long time. No history could be obtained.

WOUNDS OF THE HEART.

Several cases have been reported of survival for surprisingly long periods after wounds of the heart. Thus, G. A. White^{Nov. 147}¹ reports first the case of a Chinaman, aged 18, who received a stab wound in the left side twelve days before death. The immediate cause of his demise was a walk of 3 miles (5 kilometres) and back,

contrary to advice. At the autopsy it was found that the left ventricle had been punctured near its apex and the pericardium incised both in front and behind this wound. Secondly, the case of a burglar who received the charge of a shotgun at short range, by which it was found *post-mortem* that the anterior wall of the aorta, for the space of $1\frac{1}{2}$ inches above the base of the heart, was torn away and the left auricle apparently completely destroyed. Nevertheless, this man was able, after receiving the injury, to drag himself through a narrow aperture, step over a considerable obstruction, and run almost 70 feet.

Thomas, of Rotterdam, ^{Dec. 15, '88} ⁶ reports a case of a girl who received from a knife a great, gaping wound in the left ventricle. After its infliction she got up from her seat and ran into another room, a distance of about 8 yards ($7\frac{1}{2}$ metres), where she died in five minutes. Kravkoff ⁹⁶ _{May} reports that a Cossack who had been stabbed in the heart, after four weeks' stay in the hospital, was discharged well, and rejoined his regiment; but about five days later he was ordered to lift a heavy object, whereupon he instantly died. An autopsy was made, and Kravkoff makes an apparently justifiable conclusion that the patient was really cured, but that the young scar received an undue strain. Tcheukunoff ⁹⁶ _{May} reports the case of a boy under 4 years, who did not die until the eleventh day after a shot wound which pierced the pericardium and made an oblique groove in the front wall of the left ventricle, at the inner end of which groove the bullet was imbedded. The physician had not suspected the cardiac lesion during the child's life, since the rhythm and sounds of the heart had not been abnormal. Zisman ⁹⁶ _{May} reports the case of a middle-aged policeman who was shot, but nevertheless survived, under chloroform, amputation of both legs for dry gangrene on the forty-fourth day after his injury, and lived until the 158th day, when he died from acute pulmonary and intestinal tuberculosis. The bullet had perforated the pericardium, made a deep groove about $1\frac{1}{2}$ finger-breadths long in the anterior and adjoining outer wall of the left ventricle, afterward traversing the whole thickness of the left lung. Cristani ² _{Apr. 27} has recorded the case of a man, aged 25 years, who survived for thirty-nine days a stab which deeply wounded the wall of the left ventricle, although it had not actually punctured its cavity. Messeri, of Florence, ² _{Apr. 27} also relates the case of a man, aged 30 years, who

lived twenty-one days after a knife had wounded the right ventricle close to the interventricular sulcus, and had also wounded the septum near its anterior margin.

MOVABLE HEART.

Rumpf⁶ has studied 5 cases of movable heart. Three were the results of dietetic and medicinal attempts to cure obesity, one occurred after violent nervous excitement, and in one no cause could be assigned. The chief symptoms were great debility, incapacity for work, pains in the chest, uneasiness, anxiety of mind, vertigo, asthma, and accelerated pulse. In all the cases the signs were less when the patient lay on his back, worse when he was on his side, and relieved by standing up, although not entirely so. In one case the apex-beat shifted 13 centimetres (5.12 inches); in another, 4 to 5 centimetres (1.60 to 2 inches), with change of position; whereas the average normal movement of the heart is, at most, $3\frac{1}{2}$ centimetres (1.38 inches). Pick⁸ has examined 1000 persons with regard to mobility of the heart. In a very great majority there was no perceptible difference in the area of dullness on percussion, nor in the position of the apex, on change of position of the subject. In about 6 per cent. of the cases the heart settled somewhat toward the left when the subject lay on his left side, say, $1\frac{1}{2}$ to 2 centimetres (0.60 to 0.80 inch). Abnormal mobility was found in some healthy and powerful persons as an apparent congenital anomaly; and, again, as an accompaniment of organic disease of the heart and of other organs, without, however, any apparent etiological relation to the latter. Abnormal mobility may develop as a result of emaciation. In some cases there are no symptoms, but in the large majority there are attacks of palpitation, a sense of weakness and giddiness upon running or exertion, and also an inability to lie upon the side, particularly the left side.

CARDIAC THERAPEUTICS.

In an interesting discussion at the Académie de Médecine, ³ Jan. 28 G. Sée maintained the incontestable superiority of alkaloids and glucosides over plants, morphine over opium, atropine over belladonna, digitalin over digitalis, and strophanthin over strophanthus. In aortic insufficiency, if the heart is failing and compensation overcome, sparteïne or strophanthin is necessary; if there is oppression,

which is the first sign of disturbed circulation, he prefers iodide of potash. In mitral stenosis in young women, often no treatment is needed; but if there is dyspnoea, iodide; if there is dropsy, digitalis or caffeine. If there is mitral insufficiency or failure of cardiac muscle in the disturbed period, wrongly called asystolic, strophanthus can neither slow nor regulate the pulse as digitalis and iodide will; nor can it relieve dyspnoea like iodide, aided by injections of antipyrin. It cannot remove dropsy even when it causes diuresis, because the diuresis is only moderate, but the true diuretics, like milk, benzoate of caffeine, digitalis, and calomel, are all energetic and prompt. In fatty or fibrous conditions of the heart, the long-continued use of iodide may be supplemented by strophantin, sparteine, or convallarine. In hypertrophy of the left ventricle caused by loss of elasticity in the arteries, iodide, with or without cardiac tonics, can alone prevent degeneration of the cardiac muscle and dilatation. It is the same with affections of the coronary arteries and angina pectoris; here, in addition to iodide, inhalations of pyridine and subcutaneous injections of antipyrin relieve the pains. Strophanthus has no real advantage over strophantin, which is the only active principle. Strophanthus varies enormously and its physiological action is poorly defined. To-day the glucoside is a definite chemical product whose action is well known, and if we add to it diuretics like digitalin, caffeine, or, better, theobromine, we reach results superior to those of any other medication. See classifies cardiac medicaments in three groups: 1. Respiratory or anti-dyspnoeic: iodide of potash, atropine, pyridine, and erythrophleine. 2. Cardiac tonics: sparteine, strophantin, digitalis and digitalin, convallaria majalis, convallamine, and salts of potash. 3. True diuretics: milk, adonis vernalis, caffeine, calomel, and strophanthus. To these true cardiac medicaments may be added: (1) vascular excitants, as ergot; (2) vasomotor depressors: chloral, nitrite of amyl; (3) sedatives: bromide of potash; (4) antipyrin, which suppresses all the pains and cardialgias without producing the least alteration of blood or cardiac action or blood-pressure.

Dujardin-Beaumetz recognized the superiority of alkaloids, but considered that, of the diuretic and tonic cardiac remedies, the alkaloids in use are not sufficiently fixed and definite products. In renal insufficiency he has obtained marvelous results with stro-

phanthus. Constantin Paul has used pills containing a milligramme ($\frac{1}{1000}$ grain) of extract of strophanthus, and others containing $\frac{1}{10}$ milligramme ($\frac{1}{10000}$ grain) of strophanthin, prescribing 2 or 3 a day. The extract of strophanthus has appeared to him, as to Bucquoy, much more active than strophanthin. Strophanthus is diuretic, and has a certain tonic action on the heart, but scarcely any on the frequency of the pulse. The drug is therefore more renal than cardiac. Its diuretic action is less than that of digitalis, but begins on the first day, while we must wait three or four days for the action of digitalis. Strophanthus renders the greatest service in cases of mitral disease at the period of dropsy. Digitalis may be used if strophanthus fails, or they may be used alternately. Strophanthus, although having a secondary value, is of real service, and is much superior to caffeine, adonis vernalis, and sparteïne. Bucquoy claimed that strophanthus is a cardiac medicament of the first order, ranking with digitalis and answering to the same indications. He does not accept the conclusions of G. Sée, who pretends that strophanthus is not a diuretic. Though not producing such copious diuresis as digitalis, the diuresis is constant, and may amount to 4 or 5 litres (4 or 5 quarts) in twenty-four hours. Finally, strophanthus is superior to every other cardiac medicament in mitral stenosis, when the heart begins to fail. Dyspnœa and oppression disappear often as by magic. In cardio-aortic lesions, when the heart begins to fail, strophanthus is equally of great use, though digitalis is sometimes contra-indicated. Strophanthus may, without inconvenience, be given a long time and does not lose its effect. The only symptom of intolerance is occasional diarrhœa without colic. He prefers the extracts of strophanthus, and prescribes granules of 1 milligramme ($\frac{1}{1000}$ grain), corresponding to 5 drops of Fraser's tincture. With strophanthin he has obtained much less favorable results. The latter does not cause diuresis nor relieve dyspnœa. Again, in 3 cases of angina pectoris he has obtained remarkable success with strophanthus, although Sée says that this drug is contra-indicated in this disease.

Sée, in reply, admitted that strophanthin does not cause diuresis, but claimed that, although strophanthus does cause diuresis, this result is obtained by inducing a veritable nephritis. Dujardin-Beaumetz accepted most of the conclusions of Bucquoy in regard to the action of strophanthus. In mitral disease with a feeble heart

it often acts in a marvelous manner. Diarrhoea is the only inconvenience in its use, and that is often favorable. In experimenting, he finds that extract of rose-laurel (*Nerium oleander*) has an absolutely identical action on the heart with strophanthus. The dose of rose-laurel is 10 to 20 centigrammes (1½ to 3 grains) of the extract.

At the International Congress of Therapeutics, Paris,⁸⁰ Bucquoy, in opening the discussion, said that digitalis still holds the foremost position. The differentiation of the various heart tonics and their indications still remain incomplete. Digitalis is the most reliable, but is often hardly tolerated, will cause gastric troubles, and is apt to accumulate in the economy. Convallaria and strophanthus are less trusty, but are better tolerated, and will not accumulate. Scoparius is best for regulating the heart-beats, and strophanthus for allaying dyspnoea and angina pectoris. One fact is undeniable,—that digitalin and strophanthin no more represent digitalis and strophanthus than morphine does opium or quinine cinchona. Férol and Semmola having praised digitalin, the first meaning Nativelle's crystallized digitalin and the second Hornolle's amorphous, at once several members protested, Stockwiss and Dujardin-Beaumetz deprecating the use of violent poisons so imperfectly known. Constantin Paul spoke of convallaria majalis as one of the best heart medicines, because, after producing cardiac regularity, it will keep it up for a long time.

Nothnagel⁵⁷ says there are a number of so-called substitutes for digitalis, but they are comparatively little used. In a few cases convallaria and adonis vernalis do very well. Caffeine acts principally on the kidneys, and, properly speaking, would be described rather as a diuretic than as a cardiac remedy. This drug offers great advantages when given alternately with digitalis, and the effects produced will often be remarkable. Strophanthus in its operations seems to resemble digitalis, but is not nearly so powerful or certain in its results. It has the advantage of not being cumulative. Oertl's treatment is suitable in all cases where the muscle of the heart is at fault, but not in valvular lesions. The second part of Oertl's treatment is reasonably good. We all know that a great amount of fluid swallowed must rapidly pass into the circulation and level the heart and impede its action. To greatly reduce the ingested fluid must have very beneficial effects.

Potain³² suggests that where heart disease is complicated by

embolism we should be cautious in the use of digitalis, because that drug tends to contract the capillaries, and hence might impede the establishment of collateral circulation.

The Use of Strophanthus in Childhood.—Demme,⁸⁴ from his experience in the use of strophanthus in 21 children suffering from cardiac disease, scarlatinal nephritis, asthma, and some other ailments, comes to the following conclusions: 1. Strophanthus may be given to children as early as the fifth year, in doses not larger than 3 drops of the tincture, repeated four or five times. 2. The special effect is to increase diuresis and diminish dropsy. Compensation in valvular disease is not so certainly produced as by digitalis. In ailments where the blood-pressure is normal or raised diuretic action does not occur. 3. The dyspnœa of chronic nephritis, asthma, and whooping-cough is much relieved. 4. Digitalis holds the first place for rapidly producing compensation or raising blood-pressure, and if it fail we cannot expect strophanthus will do good; but if, when compensation has been brought about, a diuretic effect is still required, or if dyspnœa is present, strophanthus may be given with advantage. It may be combined with digitalis. Demme has not observed that strophanthus is cumulative.

Adonis.—Jumon¹¹⁶ quotes the experience of Thomas Oliver in favor of adonis. As a cardiac tonic in mitral and aortic insufficiency, in every case relief was obtained from praecordial pain, palpitation, and dyspnœa. He prescribes a milligramme ($\frac{1}{65}$ grain—0.001 gramme) four times daily in chloroform-water. In general, there is great amelioration of subjective symptoms, relief from painful palpitation, and headache. Diuresis is increased indirectly through increase of arterial tension. In aortic insufficiency the best results were seen in cases due to rupture of valvules or to chronic aortitis rather than to those resulting from rheumatic endocarditis. For some time P. Marfori and Borgiotti have used adonis æstivalis, which is much commoner in Italy than adonis vernalis. Its employment is followed by a notable improvement in the subjective symptoms; cyanosis disappeared, diuresis was established, œdema rapidly diminished, digestion became easy, and appetite returned. In some cases a diminution in the size of the heart and liver was made out. Dilatation of the pupil was noticed. Cardiac pulsations diminished in frequency and diuresis increased

in proportion. According to the Italian physicians, adonis possesses much more energetic diuretic properties than adonidin, but the diuresis does not appear until several days after the beginning of treatment. The urine receives an orange-yellow tint. Adonis is particularly valuable in cardiac affections attended with marked stasis, and where it is necessary at the same time to regulate the cardiac rhythm and obtain long-continued diuresis. The daily dose is 4 to 8 grammes (1 to 2 drachms) in infusion, and does not need to be interrupted as often as digitalis. .

Nux Vomica in Heart Failure.—Bowie⁶ calls attention to the value of small doses of tincture of nux vomica, repeated at short intervals, in cardiac failure. He gives notes of 2 severe cases of heart failure, in which the attack was overcome by small doses repeated every half-hour or hour. The author thinks that the nux vomica, in the above cases, stimulated the motor centres and the ganglionic system to increased activity, and rescued the patients from the consequences of obstructed pulmonary circulation and engorgement of the right heart.

Lactose.—G. Séé¹⁶⁴ gives an explanation of the diuretic action of milk. The most infallible diuretic is milk. It constitutes also a complete aliment, but does not contain a suitable amount of fat, casein, and sugar. Milk taken in large amounts causes glycosuria. Séé has discovered, by experimenting with the several constituents of milk, that its diuretic action is due to lactose. It crystallizes easily, and is soluble in 6 parts of cold and 2½ parts of warm water. Lactose is the most powerful and certain of known diuretics, and does not induce glucosuria, as milk does. A dose of 100 grammes (about 3 ounces 2 drachms) diluted in 2 litres (2 quarts) of water causes considerable diuresis in all cases, whatever the cardiac lesion. In 25 severe cases observed with care, there was obtained, in twenty-four to forty-eight hours after beginning treatment, on an average, 3200 and 3500 grammes (102 ounces and 112 ounces) of urine in twenty-four hours, and in 2 cases 4000 and 4500 grammes (128 ounces and 144 ounces), continuing three or four days. Diuresis ceases when the treatment is discontinued.

Séé concludes as follows: Lactose is the most powerful and least offensive diuretic. It alone gives to milk its diuretic property. The other principles of milk, especially water and the salts, have

no manifest or useful action. One hundred grammes (3 ounces 2 drachms) of lactose in solution produces an enormous diuresis, which cannot be obtained by 4 or 5 litres (4 or 5 quarts) of milk, though the latter contain 200 to 250 grammes (6 ounces 4 drachms to 8 ounces) of lactose. The action of the lactose is hindered by the casein and fat. Using 100 grammes (3 ounces 2 drachms) of lactose daily, the urine increases rapidly to $3\frac{1}{2}$ litres (7 pints) or even $4\frac{1}{2}$ litres (9 pints) on the third day. Then the amount remains stationary or falls to $2\frac{1}{2}$ litres (5 pints) for several days. In the meanwhile dropsy rapidly disappears. After a few days the same treatment may be repeated. In dropsy of renal origin the action of lactose is doubtful or negative. In cardiac cases, if the amount of albumen is small, lactose causes diuresis. The amount of diuresis produced by lactose gives us a measure of the renal degeneration. Diarrhoea may be produced. The treatment is, in general, perfectly tolerated. Lactose presents the great advantage over milk diet of permitting the patient to take any kind of food, including meat, which is often indispensable to support the failing strength. Lactose is a physiological diuretic, exercising a selective action on the secreting elements of the kidney. The cardio-vascular drugs which increase arterial tension—digitalin, convallamarine, strophanthus—are much feebler and less certain in their action on dropsy than lactose. The action of caffeine is similar to that of lactose, but the former may cause nervous and cerebral troubles.

Calomel in Cardiac Dropsies.—Many favorable reports are made. Among others, Sée³ states that in dropsy of cardiac origin he has found remarkable improvement under the use of calomel. Success is certain in two-thirds of the cases. The urine is increased to 3, 4, or 5 litres (3, 4, or 5 quarts) in twenty-four hours, and diuresis continues several days after medication is suspended. Dropsies of other origin do not yield to calomel. Calomel acts by stimulating the renal epithelium. It is a glandular medicament like pilocarpine. Sée recommends 40 to 60 centigrammes (6 to 9 grains) in twenty-four hours, divided into two or three doses, to be continued for three days.

Chlorate of potash is used to prevent salivation, and opium to guard against colic or diarrhoea.

Coronilla (a New Heart Remedy).—Coronilla scorpioides⁸⁰ was introduced as a cardiac remedy in 1886 by Cardot, of Nancy,

but attracted little attention. Recently it has been investigated by several observers. The remedy is stated to act especially on the myocardium, whose contractility it increases. Spillman has employed it in 17 cases of heart disease during the asystolic period. The results were satisfactory in 8 cases, doubtful in 2, and entirely negative in 7. Diuresis was frequently observed, the daily amount of urine increasing in a few days from 7 ounces (217 grammes) to 2 to 4 quarts (2 to 4 litres.) Its action on the number and rhythm of the cardiac pulsations was feeble, but oedema was diminished and respiration improved. The therapeutic effect is only perceptible twenty-four or thirty-six hours after the first dose, and in twenty-four hours after the cessation of the use of this drug the patient's condition returns to its original state. While Schlagdenhauffen states that $\frac{1}{2}$ grain (5 centigrammes) is a poisonous dose, Spillman recommends the administration of from 3 to 5 grains (19 to 32 centigrammes). Evidently, further studies are required before definite opinion can be expressed as to the value of this drug.

Barr, of Liverpool,¹⁸⁷ reports a case of large thrombus in the right auricle, where much improvement followed the exhibition of aqua ammoniae fortior, 5 minims (0.31 cubic centimetre), in ice-water, every half-hour. Unfortunately, pulmonary embolism ensued, with a fatal termination.

Bowen likewise¹⁸⁷ reports a case of a large embolus in the pulmonary artery, *post-partum*, which ended in recovery under ammonia, the patient remaining in excellent health nearly seven months after her illness. She had taken of aqua ammoniae fortior 5 ounces and 32 minims (20.45 cubic centimetres).

Peter,¹⁸² in a clinical lecture upon a case of uncomplicated mitral regurgitation, recommended hydropathic treatment, combined with other therapeutic efforts, as a means of invigorating the circulation. At first a rapid friction of the whole body was to be carried out night and morning, with flannel moistened with cologne-water; then a rapid sponge-bath with tepid water, to which was added $\frac{1}{10}$ part of cologne-water, was to be given, the sponge being moist, but not dripping; and, finally, cold water was to be used, still with the addition of alcohol. He also¹⁸⁸ calls attention to the fact that in valvular diseases of the heart a hot bath is certain to induce intense dyspnoea, the reason being that the heat dilates the capillary blood-vessels, and thus temporarily disturbs compensation.

DISEASES OF THE MOUTH, STOMACH, PANCREAS, AND LIVER.

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DISEASES OF THE MOUTH.

XEROSTOMIA, OR DRY MOUTH.

SINCE the subject was brought before the Neurological Society of London by Hutchinson, in 1887, 12 cases of this peculiar condition have been reported. With the exception of 2 recorded by Seifert,⁸ all the patients were women, most of whom had already passed middle life. It began suddenly in 3 cases, being preceded in 2 by a severe mental shock; in a fourth case it developed in an hysterical woman, who had also had anuria, while a fifth is described as very hypochondriacal. With these exceptions, it does not seem to have been preceded or accompanied by any special nervous disturbances. The tongue is red, devoid of epithelium, cracked, and absolutely dry. The inside of the cheek and the hard and soft palate are also dry, and the mucous membrane smooth, shining, and pale. Diminution in the nasal and lachrymal secretions has also been noted, as well as dryness of the skin and falling out of the teeth. The urine is normal and no change in the salivary glands is apparent, nor has any mechanical obstruction been discovered. The general health and the digestion are unimpaired, but swallowing and articulation are difficult owing to the absence of moisture. The disease usually reaches its greatest intensity rapidly, and may then remain without change for years. As regards its pathology, Hadden⁴⁷ suggests that it is due to an affection of a still hypothetical centre controlling the secretion of all the salivary and buccal glands. Treatment has proved very unsatisfactory. Hadden and Morgan²² found benefit from jaborandi, Butlin and Seifert from pilocarpine, while others have found neither of value. Opinion is also divided as regards

iodide of potassium, but the application of glycerin to the mouth has proved decidedly beneficial.

Cancrum Oris.—Gates and Kingsford⁶, report 3 cases of canerum oris in which recovery was brought about by means of the following method of treatment: All sloughing masses were cut away, and the ulcerated surfaces swabbed once or more daily with a 1-500 solution of corrosive sublimate, while a 1-1000 solution was kept constantly applied. Healthy granulations soon appeared, and recovery was rapid. The danger from such strong solutions must not be overlooked. Murray⁶ has treated 7 cases during the past year, at the Liverpool Infirmary for Children, by excising the diseased tissues, as far as possible, till bleeding occurred, and then applying strong nitric acid. Four completely recovered, although in 2 of them the disease was very extensive. In 2 of the 3 cases which terminated fatally pneumonia existed as a complication, while in the third death resulted from chronic septicæmia. He considers that cleanliness is of great importance in the after-treatment; the mouth should be frequently syringed out, and during the first week all food is best given by means of the nasal tube.

DISEASES OF THE STOMACH.

PHYSIOLOGY.

Many interesting papers have appeared during the past year on the physiology of the stomach and the chemistry of digestion. Although but little is new, much of the work of former years has been confirmed or criticised. Quincke²⁷³ has reported the case of a boy with occlusion of the œsophagus, on whom a gastric fistula had been established, which gave an opportunity of watching a normal stomach. The behavior of the pylorus was especially interesting. It is commonly supposed to be in a nearly constant condition of tonic contraction, but nothing of this kind was seen; on the contrary, it opened and shut at varying intervals, assuming a variety of shapes,—sometimes round, then oval, and again appearing as a slit. The contractions of the gastric walls never raised the tension of the interior of the organ to any extent, and any attempt to do this artificially caused discomfort to the patient. From this the author concludes that the abdominal walls, rather than the muscular coat of the stomach, resist pressure from

within, or, failing to do so, are responsible for gastric dilatation. He also found that the temperature averaged 0.12° C. (0.17° F.) higher than in the rectum, and that, when a pint of cold water was put in, it became warmer rapidly during the first five minutes, then more slowly, not reaching the body-temperature for half an hour.

The reproduction of the gastric mucous membrane is the subject of a paper by Griffini and Vassali,⁷⁶⁸ B.B.P. 422, who cut away pieces from the stomachs of dogs, and found that small wounds were immediately closed by contraction of the muscular coat. In larger wounds there was finally a reproduction of epithelium and glands, the time for the complete process occupying about thirty days.

Pavloff and Shümova-Simanovskaia⁵⁸⁶ No. 15, June⁹⁰ investigated the exciting cause of the secretion of gastric juice, by dividing the œsophagi of dogs and sewing the cut ends to the skin, so that all food swallowed escaped through the wound. They found that the act of deglutition causes a flow of secretion containing both hydrochloric acid and pepsin. Division of the splanchnic nerves does not affect the experiment, but division of the vagi prevents the secretion, even when the food is allowed to go into the stomach. Stimulation of the peripheral cut end of the vagus is followed by a flow of pure gastric juice.

Pick⁸⁸ No. 18 found, by catheterizing the stomach of 10 healthy persons when they had been fasting for twelve hours, that there was always some fluid present, which often showed no trace of hydrochloric acid or pepsin. In some cases the introduction of the catheter at first caused a considerable secretion of gastric juice, but after becoming accustomed to the process the amount decreased and the hydrochloric acid and pepsin disappeared. For the diagnosis of hyperacidity, the possibility that the presence of gastric juice may be due to the catheterization must be considered, especially if only one examination be made. As he often obtained 60 cubic centimetres (2 fluidounces) of liquid from a fasting stomach, he believes, with Riegel, that the diagnosis of hypersecretion can only be made when at least 200 cubic centimetres (6½ ounces) are found.

Girard⁴¹⁰ July believes, with other French authors, that the stomach has the power of distinguishing different kinds of irritation, and that the fluid secreted after the passage of a tube differs from true

gastric juice, which is only found in the presence of food. He finds that the rectal absorption of food produces changes in the amount and character of the gastric secretion.

The effect of different substances, often given as drugs or beverages, on the secretion of the gastric juice is discussed in several papers. Wolff,¹¹¹ _{E.16, M.3, 4} finds that cognac in small quantities increases the secretion of hydrochloric acid, but larger amounts diminish it. The long-continued use of alcoholic stimulants lessens the power of ordinary food to excite a flow of gastric juice. Caffeine, in doses of over 20 centigrammes (3 grains), decreases the hydrochloric acid and sometimes the peptones. Nicotine put into the stomach seems to act as an irritant, but sometimes its long-continued use creates a need of gastric stimulation. Strychnine generally increases the total acidity. Condurango produces no effect. Ox-gall, although it decreases the total acidity, does not influence the amount of secretion or its peptonizing power. Common salt, in solution above $2\frac{1}{2}$ per cent., weakens the acidity more than an equal amount of water. The administration of hydrochloric acid produces no effect on the secretion of acids, but often seems to increase the formation of peptones. The exciting power of carbonic acid is probably as much mechanical as chemical.

Eklund, of Stockholm, corresponding editor, reports the investigations of Sanberg on the effects of the waters and salts of the Carlsbad springs on the functions of the stomach. A large number of experiments were made, both on patients with some gastric disturbance and on persons in perfect health, with very variable results. In some cases no effect at all was produced; in others the amount of hydrochloric acid was decidedly diminished, while in others, where the absence of free acid had previously been proved, the amount steadily increased, and at the end of a few weeks was found in normal quantity.

The influence of saccharin has been carefully investigated in a series of experiments by Gans,⁴ _{Apt. 1} who finds that, when in solution, it produces no bad effect on the process of digestion in either stomach or intestines. It may do indirect harm after its absorption by an influence on the nervous system. Katz,⁶⁵⁰ _{V.12, No. 27, 29} shows that artificial digestion is retarded by morphinæ muriat., and by sulfonal in the strength of 1.5 grammes (23 grains) to 100 cubic centimetres ($3\frac{1}{2}$ ounces) of fluid. The process is not influenced by

atropinæ sulph., strychniæ nit., chloral, potassii arsenitis, strophanthus, or creasote. It is hastened by salts of quinine.

DIAGNOSTIC METHODS.

Ewald's salol test for the motor sufficiency of the stomach has been much criticised during the year. Brunner, ⁶⁹ _{Feb. 14} by experiments on 60 healthy persons, found that the time in which salicyluric acid appeared in the urine after a dose of salol differed widely in the same person under the same circumstances, often being longer than Ewald's maximum, sixty to seventy-five minutes. He believes that the test is unreliable. Ewald, ⁶⁹ _{Mar. 14} in reply, says that a longer time than seventy-five minutes is exceptional under normal conditions. The salol must always be given in the same way, preferably 1 grammme (15½ grains), divided in three capsules, one hour after dinner. Although he does not claim infallibility for the test, he still considers it valuable.

Huber, ³⁴ _{May}, after numerous experiments, agrees with Brunner, that, as practiced by Ewald, the salol test is unreliable. But he has obtained good results by noting the time when the last trace of salicyluric acid has left the urine. The process is as follows: The patient is given 1 grammme (15½ grains) of salol in capsules one-half hour after the beginning of the noon meal. The urine of that day is not examined. On the next it is passed every three hours, and tested each time for the acid by acidulating with HCl, shaking with ether, and adding ferric chloride after removing the ether. A violet color shows its presence. It should have entirely disappeared twenty-seven hours after the ingestion of the salol, the length of time over this showing the degree of motor insufficiency. This does not agree with Ewald, who says that it takes forty-eight hours to disappear.

Decker ⁴ _{Nov. 11} agrees with Brunner and Huber, and considers the latter's test a practical one, but suggests that in certain diseases of the intestines the salol may fail to be entirely reduced and the salicylic acid entirely absorbed as quickly as usual. Bourget ¹⁹⁷ _{Dec. 83} found that hydrochloric acid taken with a meal retards the appearance of salicyluric acid, but that it is hastened by a diet of fruit and vegetables.

A year ago Klemperer ⁶⁹ _{No. 47, '88} published a test of the motor power of the stomach, by introducing 100 grammes (3½ ounces) of olive-oil.

This is not absorbed by the stomach. At the end of two hours the gastric contents are removed and the amount of oil measured. In healthy subjects he found that only 25 grammes ($6\frac{1}{2}$ drachms) of the oil remained; in cases of motor insufficiency as high as 75 grammes ($2\frac{1}{2}$ ounces) were found.

Boas³¹⁹ has discovered that intestinal fluid can be easily pressed from the duodenum into the stomach, from which it can be obtained by the stomach-tube. Generally, a gentle rubbing of the abdomen from the region of the right hypochondrium toward the median line is sufficient; if not, a gentle massage of the region of the right lobe of the liver, and perhaps also of the left lobe, is all that is necessary. By this latter method he thinks that small amounts are pressed out of the pancreatic duct and gall-bladder. The stomach should be empty. If the presence of gastric juice is suspected it should be washed out with a weak alkaline solution. The fluid obtained possesses all of the characteristics of the intestinal juice; it digests fibrin, changes starch into dextrin and maltose, and emulsifies fats. It is either clear or slightly cloudy, and colored yellow or green, according to the amount of bile it contains, and has an alkaline reaction.

Tschlenoff²¹⁴ finds that the intestinal fluid obtained by the method of Boas digests food speedily and thoroughly, and suggests that in cases of atrophy of the gastric glands, and consequent absence of gastric juice, the stomach might be used as an annex to the duodenum by filling it with intestinal fluid.

Günzburg⁶⁹_{Oct. 10} proposes a new test for the time required for gastric digestion. A short rubber capsule, vulcanized so that the end, if pinched together, springs open again by its own elasticity, is filled with a few grains of iodide of potash. The mouth of the capsule is then closed by tying with three threads of fibrin, previously prepared and kept in alcohol. The whole is put into a capsule of gelatin. The test is as follows: Half an hour after a test breakfast a capsule is swallowed and the saliva tested every fifteen minutes for the iodide. The time which is taken by the stomach to digest the threads of fibrin is found by giving the same person, on another day, the same amount of iodide, simply inclosed in a gelatin capsule, and testing the saliva every five minutes. This shows the length of time required to dissolve the gelatin and absorb the iodide, and is subtracted from the time in the original test.

In obtaining gastric juice for analysis the following precautions are advised by von Sohlern²¹: The tube should be very soft, 80 centimetres (32 inches) long by 3.8 to 4 centimetres (1½ to 1½ inches) in circumference. An elastic staff is put into it, and withdrawn as it reaches the stomach. The first passage of the tube should be effected as easily and rapidly as possible. If the gastric contents begin to rise around the tube it must be withdrawn, otherwise there is danger of filling the trachea. An ulcer need cause no alarm if a soft tube is used. Before the operation the throat, larynx, and heart should be examined, and the absence of aneurism established. After the tube is in place, the patient should cough forcibly or press hard with his abdominal muscles. In this way 70 to 80 grammes (2½ to 2½ fluidounces) will generally be ejected; if not, gentle aspiration may be used. A stomach-pump is dangerous. There has been much discussion on the relative merits of a test breakfast and a test midday meal for diagnostic purposes. Jürgensen,⁴ after using the dinner for some time, abandoned it in favor of the breakfast, as being more convenient to the physician and patient, and as generally giving better results. He explores the stomach three and a half hours after the meal. Von Sohlern²¹ prefers the test dinner, and examines three hours after it. He gives bouillon, minced beefsteak, and well-boiled rice.

Chemical.—Of the older tests for free hydrochloric acid, Günzburg's phloroglucin-vanillin is generally considered the most satisfactory. Methyl violet, Congo red, and tropäolin are also in constant use. Moritz,³⁴ for a rough analysis, simply removes the organic acids by shaking with ether and then titrates with a decimal solution of sodic hydrate until an alkaline reaction appears. This method he considers sufficiently accurate for practical purposes.

Uffelman's carbolated-iron test is generally used for lactic acid. Pepsin is recognized by its power of digesting albumen in the presence of HCl. There have been several papers describing new methods or modifying old ones for the quantitative analysis of HCl. Most of them can only be undertaken in a chemical laboratory. Leo³⁶⁵ separates the acidity due to free acids from that due to acid salts on the principle that a solution of acid phosphate of potash or soda, when mixed with powdered CaCO_3 , loses nothing of its acid reaction, whereas a free acid is immediately neutralized. He tests the acidity of the gastric contents with litmus, and then,

mixing with CaCO_3 , tests again. If the litmus remains blue on the second testing the acidity was entirely due to free acid; if it turns red, a comparison with the red of the first testing shows the relative proportion of acid salts and free acids. A quantitative analysis for HCl is obtained by first removing the organic acids with ether.

Sjöqvist³³ has published a method on the principle that, if the contents of the stomach are mixed with BaCO_3 and dried on a water-bath, the free acids are changed to barium salts. By fusing the mass BaCl_2 alone remains unchanged, the salts of the organic acids being burnt to BaCO_3 . By treating with water the BaCl_2 alone is dissolved, and from this the amount of HCl is calculated.

Moritz³⁴ takes two equal specimens of gastric juice, removes the lactic and fatty acids by ether, and adds a small quantity of NH_4Cl . The first specimen is burnt to an ash, driving off the free HCl and NH_4Cl , leaving the other chlorides. The second is neutralized with NaOH , changing the free HCl to NaCl . It is then burnt, and the NH_4Cl alone is driven off. The difference in the amount of chlorine in the two results represent the original free HCl .

For a qualitative analysis of free HCl , Boas³¹⁹ recommends resorcin as being a test not responsive to any organic acids or to the acid albuminous compounds. The reagent is composed of resorcin, 5 grammes (77 grains); sugar, 3 grammes (46 grains); and sufficient dilute spirit to make 100 grammes ($3\frac{1}{3}$ ounces). Five or 6 drops, or less, of the gastric secretion are mixed with 2 or 3 drops of this solution, and heated in a watch-glass or on a porcelain plate over a small flame. When completely evaporated, there develops a rose-red or cinnabar-red color, resembling that of the phloroglucin-vanillin reaction, which gradually becomes discolored on cooling. The reaction can in like manner be developed on a piece of filter-paper. Too strong a heat must not be employed, or the sugar is burnt and the test does not succeed. After repeated trial of the resorcin-sugar test, the author concludes that, in all cases in which tropaeolin, methyl violet, and the Günzburg and other tests give a positive result, this will do so likewise. A very convenient method is to administer to the patient, shortly before lavage is performed, a capsule containing 0.2 grammes of resorcin and 0.1 grammes of sugar. A few drops of the filtered or unfiltered gastric contents can then be evaporated on the porcelain plate, as before.

Since it has become common to test for free hydrochloric acid in the gastric contents, several observers have shown that different substances often found in the stomach are capable of combining with it. The color tests will then show no reaction. Moritz⁸ _{Feb. 4} found no free hydrochloric acid in the stomach of a man with hyperacidity of the gastric juice until the fourth hour after he had taken a large amount of albuminous food, whereas after a meal of potatoes it appeared in the second.

Pfungen⁸ _{Mar. 1} shows that, among other things, fibrin, peptones, acid phosphates of lime, milk, and eggs may modify or prevent the reaction with Günzburg's test.

THERAPEUTIC METHODS.

The list of therapeutic methods and drugs recommended by different authors is so very long that we are obliged to limit ourselves to the more important ones. Wettendorfer⁵⁷ _{May 19} first discovered, by accident, that elastic compression of the abdomen cured a case of painful dyspepsia. Since then he has had very good results with it in several cases of disturbed digestion. He uses a rubber bandage, 8 to 10 inches (20 to 25 centimetres) wide. The skin should first be sprinkled with starch to prevent erythema. The bandage is put on for about an hour after each meal.

Kevin¹⁶ describes the so-called hot pad and binder of the hydropaths, which he has found useful in painful dyspepsia. It is made of three parts: (1) a pad (four-ply of swansdown) about 12 by 6 inches (30 by 15 centimetres); (2) a roller 2 yards (2 metres) long, half swansdown and half mackintosh; (3) 1½ yards (1.36 metres) of flannel binder. The pad is put into boiling water and wrung out, and is then put over the abdomen at bed-time, covered with the cotton and water-proof, and over all the flannel binder. In the morning all is removed; the abdomen is sponged with cold water and rubbed with a rough towel. The flannel binder is then put on and worn throughout the day, or the whole apparatus may be worn constantly.

The Scotch douche is thus described by Decker³⁴ _{May 23}: A stream of water, the size of a finger, is directed against the region of the stomach. The temperature of the water changes every twenty seconds between 80° and 50° F. (26° and 10° C.), and is continued for three minutes. Fournier²⁴ _{Jan. 27} reports a case of ulceration of the

stomach, alcoholic gastritis, and moderate dilatation, accompanied by intense pain and obstinate vomiting. The patient had suffered for over a year in spite of treatment. Fournier washed out his stomach every day with an alkaline solution. For a few days there was some improvement, then a relapse. Lavage with bismuth was then tried, and followed by immediate and permanent improvement. The process is as follows: The stomach is first washed out with an alkaline solution. Two and a half drachms (9.7 grammes) of subnitrate of bismuth, suspended in a pint of water, is then introduced and allowed to remain ten minutes, when it is withdrawn. Ziemssen²²,_{July} recommends the use of very large electrodes, 12 by 8 inches (30 by 20 centimetres), for the therapeutic application of electricity. It is applied over the surface of the gastric region half an hour before meals; after this, a dry faradic brush should be brought over the skin frequently. Pulido, of Madrid, Spain, corresponding editor, reports a case occurring in the practice of Ortega⁵⁰³,_{Apr. 7} of chronic vomiting, in a young lady of 18, who, without known cause, vomited all the food she took. No drug produced any effect. At last hypnotizing was tried. While in the trance the retention of food was suggested. It took place within two days, and, with some slight relapses, became permanent.

In answer to the question, "Is there any harm in the practice of habitually using antacids for the relief of acid dyspepsia?" Roberts²,_{Aug. 17} replies that with due precautions the practice is harmless. He uses the bismuth lozenge of the British Pharmacopœia, which owes its antacid properties to $3\frac{1}{2}$ grains (0.22 gramme) of chalk and $2\frac{1}{2}$ grains (0.16 gramme) bicarbonate of soda, or a lozenge of his own, similar to it, but containing 1 grain of common salt instead of the bismuth. They should not be used within an hour after breakfast or an hour and a half after dinner, and not regularly, but only as occasion arises to relieve gastric pain. Lime-water with milk has often too little alkaline power to be of use; in such cases it may be replaced by 5 to 10 grains (0.32 to 0.64 gramme) per ounce (30 cubic centimetres) of bicarbonate of soda.

The usefulness of preparations of pepsin and peptones as drugs is a subject on which there is much difference of opinion. Munk⁶⁹,_{Feb. 14} thinks that they should be used in solution whenever there is a deficiency in the secretion of hydrochloric acid, or where, after

being secreted, it is quickly neutralized by abnormal products of gastric digestion in cases of dyspepsia, dilatation, and cancer. If necessary, they can be administered by the rectum. Ewald has shown that some preparations of pepsin and peptonized albumen given by the rectum increase the amount of urea excreted. Bourget, ¹⁹⁷ _{Dec. 30, 1888} on the other hand, thinks that the administration of pepsin is generally useless. He considers that a small amount of pepsin is sufficient for gastric digestion, and that enough is almost always to be found in the stomach. To this Hare ¹¹² _{Aug.} agrees. Hydrochloric acid is necessary for the formation of pepsin, and the latter will generally be found in sufficient quantity in the stomach after the introduction of HCl.

Richter ⁴¹ directs attention to the dietetic treatment of purely nervous disturbances of the stomach without change in the composition of the gastric juice. It was long the custom to carefully regulate the diet in these cases, giving especially animal food, which often reduced the weight and strength of the patient without producing much effect on his digestion. The author has found that much better results are obtained by giving a generous mixed diet. The irritation of vegetable food seems to be a positive advantage, and is not contra-indicated by the presence of a slight gastric catarrh, provided that this be entirely of nervous origin. The indirect advantages to be gained are even greater: the patient often gains in weight and strength, and is less liable to consider himself an invalid than if living on a restricted regimen. Altdorfer ⁴¹ _{Apr. 1} agrees with Richter that an exclusively animal diet is harmful, and believes that the best results are obtained by a purely vegetable one.

The choice of a suitable mineral water in the treatment of different forms of gastric disturbance is discussed by Ewald ⁴¹ _{May 6} in an address before the Balneological Society. He first describes the diseases which have until lately been classed together under the name of chronic gastric catarrh, which included both inflammatory and functional disorders. The former, under the general head of chronic gastritis, may be divided into (*a*) simple gastritis, characterized by a decreased HCl secretion, retarded digestion, absence or great diminution of rennet ferment, and abundant formation of lactic and fatty acids. The stomach when fasting contains little or no mucus, and very little, if any, fluid. (*b*) Catarrhal gastritis,

with similar symptoms, except that there is a large secretion of mucus. (c) Atrophy, shown by a continued absence of all HCl and fermenta, the food remaining for a long time unchanged in the stomach, and finally showing signs of putrefaction. Functional disorders may be accompanied by (a) hyperacidity when there is a very acid gastric juice and prompt digestion, the fasting stomach being found empty; (b) hypersecretion, when the fasting stomach contains fluid with all of the properties of gastric juice; (c) antacidity, when the secretion of HCl is diminished or temporarily absent; (d) atony, characterized by the abnormally long time which the stomach requires to expel its contents.

The mineral water to be chosen in treating these conditions must be carefully considered. To stimulate a sluggish stomach a water containing common salt is indicated; for hyperacidity and hypersecretion an alkaline or alkaline and saline water, and for intestinal troubles the bitter waters. Glauber salts are contraindicated in neurotic conditions of a depressing character, in which cases the proper treatment would be alkaline waters containing chlorides and iron salts, aided by hot baths, massage, electricity, and change of climate.

NEUROSES.

Boas⁶⁹ _{Oct. 17} has contributed an article on periodic vomiting, first described by Leyden. It may be due to disease of some organs or simply to neurotic disturbance. It sometimes comes on with such regularity that an attack may be predicted nearly to the hour. It resembles the gastric crises of tabes, from which it is distinguished by its periodicity, by the frequent absence of pain, and by the small amount of hydrochloric acid in the vomitus. Treatment is directed to the nervous system. Drugs, except opium, produce little or no effect. The prognosis is good when the attacks are far apart and of short duration; less favorable where they are frequent and the duration long.

Garland,⁶⁹ _{Oct. 3} after classifying the neuroses of the stomach, describes cases of vomitus nervosus. All of the women whom he has treated for this disturbance have been of a dark complexion, of a calm and self-controlled, not of a nervous or hysterical, temperament. Feeding by the mouth had to be abandoned in every case. The only drug giving any relief was opium. The author concludes: "We can only say, from our present stand-point, and

by reasoning from analogy, that the secretion of hydrochloric acid in the stomach must be governed by a special system of nerves which have a definite centre of departure. Like other similar systems, these nerves appear at times to become functionally deranged, and perform their work with a reckless disregard of the comfort of their possessors."

Leo,^{69 July 18} in an article on bulimia, describes it as a morbid increase of the sensation of hunger. It may be caused entirely by disease of the nervous system, or indirectly in connection with an affection of the stomach or of some other organ. The desire to eat may come on when the stomach is full and the digestive powers good, or even during a meal. The author cites cases in connection with exophthalmic goitre, tænia, diarrhoea, menorrhagia, and several diseases of the stomach. The morbid appetite comes on suddenly, and, if not relieved, is soon followed by other disturbances, such as pain in the head, general weakness, profuse perspiration and tremor, ringing in the ears, and sometimes pain in the region of the stomach. It is generally, at least temporarily, relieved by food. The large masses of food which the patient is tempted by his insatiable appetite to eat may be the cause of dilatation. Treatment must be directed to the cause of the complaint.

Ord⁵ cites 2 cases of inordinate hunger which he considers due to adhesions between the stomach and adjoining organs, with the result that the walls of the stomach were prevented from collapsing when that organ was empty. The first case was a lady who presented for several years recurrently the ordinary signs of gastric ulcer. She steadily developed a remarkable appetite, and for several years took nothing but mashed potatoes and butter. These she ate in large quantities, and was relieved for an hour or so. No other food and no medicine afforded similar relief. The author considers that one or more ulcers had penetrated deeply, and led to adhesions between the stomach and other organs. The second case was a man who for years had suffered from bulimia. The autopsy showed the stomach to be a large permanent cavity prevented from collapsing by adhesions due to an old abscess connected with the gall-bladder. The author suggests that a tight bandage might sometimes give relief.

Nervous dyspepsia is the subject of a paper by Decker.^{34 May 28} It is distinguished from gastric catarrh by the following symptoms:

The time and severity of sensations of pain and discomfort after eating are very variable, and do not depend upon the amount of food taken. The appetite is capricious; though generally diminished, it may be normal or increased. Vomiting is rare. Eructations are generally odorless and tasteless. The stomach should be empty seven hours after a meal. Hyperacidity of the gastric juice is common. Treatment should be directed especially to the nerves of the stomach. Carlsbad waters and too rigid diet often do positive harm. Electricity and massage are sometimes useful; also different kinds of baths and douches, especially the Scotch douche previously described.

PATHOLOGICAL CONDITIONS.

Thiéry⁷,_{Oct. 11} records a case of rupture of the stomach from a fall on the buttocks. The patient fell from a scaffold on the third story of a house, and struck the ground in a sitting posture. He died in a few hours. At the autopsy a rupture about an inch long was found on the anterior wall of the stomach near the greater curvature, through which a large amount of food had escaped into the abdominal cavity.

Smith⁵⁹,_{Oct. 12} reports a case of diffused phlegmonous gastritis. The patient was a colored cook, previously in good health. After a light dinner he was suddenly seized with colicky pains in the abdomen and vomiting. He became worse, and died on the third day. Almost the entire wall of the stomach was infiltrated with pus-cells, the mucous membrane itself being unaffected and showing no evidence of ulcer or break in its continuity. There was a slight recent peritonitis overlying the stomach. The other organs were normal.

A case of universal cystic degeneration of the gastric mucous membrane is reported by Langerhans.²⁰,_{June 1} The patient had been a drinker, but had shown no symptoms pointing toward the stomach. The process had evidently begun as a catarrhal affection; the lumina of the glands had enlarged and merged together, forming large cysts. The glandular epithelium had almost entirely disappeared.

Hüfner³¹,_{Aug. 18} made a number of examinations of the gastric juice of 10 patients who were suffering from different cardiac lesions, and found hydrochloric acid absent in all but 1. In that case it appeared very late,—six hours after the meal. He suggests several possible explanations: The increased alkalinity of the

blood; the decreased rapidity of the circulation; neutralization of the hydrochloric acid by serum due to passive congestion, even where there is no evidence of congestion in any other organ. Although the number of cases is small, the results are striking, and, if confirmed, add another disease to the list in which HCl in the stomach is found wanting.

The connection between certain morbid conditions of the stomach and diseases of other organs is the subject of a paper by Fenwick.²⁰ In old age there is generally more or less fibrous degeneration of the pyloric region, and attention is called to the fact that cancer is especially liable to attack the same parts of the body which are the seat of senile fibrous induration. Gastric atrophy occurs frequently in subjects of carcinoma of the breast, less often when the disease is in the intestinal tract, and but rarely when in other organs. It is very common in pernicious anaemia. The author suggests that in these diseases a search be made for a poison, which, being eliminated by the gastric glands, is the cause of this atrophy. Nephritis, both acute and chronic, is generally accompanied by more or less gastritis. Acute inflammation of the stomach and kidneys, occurring together, are due to the same cause, but in chronic nephritis elimination of urea by the stomach is the cause of the gastritis. Pulmonary phthisis is very often associated with gastric disturbances, sometimes the former appearing first, sometimes the latter. The catarrh of the stomach commonly found in acute lobar pneumonia can hardly be a result of the lesion in the lung, but is probably, as in cholera, measles, variola, and erysipelas, only a local symptom of the general disturbance. In typhoid fever, although the functions of the stomach are disturbed, changes in the membrane are rare. Diseases of the heart, although causing changes in the appearance of the stomach through passive congestion, do not much affect its structure. Diseases of the brain, also, are not often accompanied by disease in this organ.

Phthisis.—There have been several papers during the past year on the cause of the gastric disturbances of patients with pulmonary tuberculosis. Schwalbe²⁰ _{Aug. 1} examined the contents of the stomachs of 25 phthisical patients during life, and recorded the pathological conditions found after death. Only 6 were normal, 9 showed slight interstitial inflammation, 4 moderate and 1 decided round-cell infiltration. The remaining 5 showed no interstitial

process, but in 4 of these there was a well-marked fatty degeneration of the glands, and in 1 an amyloid degeneration of the mucous and submucous coats. In several interstitial and parenchymatous inflammations were combined. He concludes that the majority of phthisical patients have interstitial and parenchymatous gastritis, of which the latter is sometimes very severe, and may lead to destruction of the glands. The former is generally slight, never forms new connective tissue, or leads to gastric atrophy. These changes are not of the character of the disease of the lung, but are probably due to anaemia, fever, the swallowing of sputa, or nervous disturbances. There seems to be no ratio between the pathological changes and the severity of the gastric disturbances before death.

Immermann,¹⁰⁶⁰ after examining the contents of the stomach and testing the gastric juice of 54 patients with pulmonary phthisis, concludes that there is, as a rule, no great lack of digesting power, and no relation between the loss of appetite of a patient and his powers of digestion. The common gastric symptoms of phthisical patients, he thinks, must be classed under the neuroses. Einhorn⁵⁹ found hydrochloric acid generally sufficient in amount. On the other hand, Chelmonski⁹², was often able to prove the entire absence of free HCl. This, he thinks, is due partly to anaemia of the stomach and chronic endarteritis and partly to passive hyperæmia, very rarely to amyloid degeneration of the arteries or mucous membrane. Rosenthal^{46, 88} found no HCl at all in the stomachs of 6 phthisical patients, with good appetite and good digestion.

Diphtheria.—Smirnow²⁰ v.112, No. 2 investigated 6 cases of gastritis following diphtheria of the throat. Four showed a fibrinous deposit, which he did not consider diphtheria. In the other 2 there appeared a true diphtheria, especially in the epithelium of the glands. The cells had increased in size, lost their nuclei, undergone hyaline degeneration, and become the groundwork of the new membrane. There was also necrosis of the connective tissue. From these 2 cases he concludes, in opposition to Oertel, that in true diphtheria of the stomach the process does not begin by inflammation, but by necrosis, with the formation of hyaline products, which furnish the principal material for the false membrane. In the throat, when inflammatory changes occur, they are secondary, and belong to the stage of reaction.

Jones² _{Apr. 20} reports a case of gastric diphtheria, secondary to diphtheria of the nose, pharynx, and palate. The stomach had a soft, doughy feel, and the oesophagus was normal. A continuous membrane lined the whole interior of the stomach, but did not extend into the cardiac or pyloric orifices. It varied from $\frac{1}{6}$ to $\frac{1}{16}$ inch (4 to 1.5 millimetres) in thickness, and was easily peeled off from the mucous membrane. Although undoubtedly of diphtheritic origin, it resembled what is usually described as a croupous membrane.

ATROPHY.

Meyer¹¹⁴ _{Aug. 18, 1854} has made an exhaustive study of the disease known as gastric atrophy, or atrophy of the gastric glands. He suggests, as a better name, gastric phthisis. The etiology is still in doubt. It is commonly supposed to be secondary to gastric catarrh, especially in cachectic subjects, but the author suggests that an idiopathic form, which undoubtedly exists, may be due to disease of the Auerbach and Meissner plexus, or of the vagus or sympathetic. The process may be either parenchymatous or cirrhotic, or both. It generally begins on the free surface of the mucous membrane; the glands become cystic and finally disappear. It occurs equally in males and females, and generally in advanced life, but it may appear at any age. The symptoms suggest progressive pernicious anaemia, with the gastric symptoms intensified. There is generally great anaemia, but no wasting of subcutaneous fat, unless accompanied by some other disease. An examination of the gastric juice shows a great diminution or complete absence of hydrochloric acid, pepsin, and rennet ferment. The motor and absorbing powers of the stomach are diminished, and there is generally dilatation. There is no secretion of mucus, as is found in chronic gastric catarrh. Severe epigastric pain is frequent. The prognosis is bad, the disease generally ending fatally in from a few months to two or three years.

Ewald⁴ _{Dec. 3, 1881} recognizes two types of gastric atrophy,—one in which a cell-infiltration of the mucous membrane destroys the glands and causes a thickening of the muscular coat; the second, in which the process, beginning in the submucosa, which becomes hypertrophied, destroys the musculosa, and by an interstitial inflammation strangles the glands. These atrophic changes are very common in old persons, and are often the unsuspected cause of

death, but they may occur at any age. The diagnosis is not easy, the most reliable symptom being the absence of hydrochloric acid, pepsin, and rennet ferment from the gastric juice; but these may also be absent in purely neurotic affections. Litten ⁴ _{Dec. 3, '88} has seen cases in which hydrochloric acid and the ferments were absent for weeks, and finally returned. He thinks that atrophy can only be proved when they remain absent for months. Rosenheim ⁴ _{Dec. 17, '88} believes that atrophy of the stomach may exist for years with no severe symptoms and without much disturbance to nutrition, digestion being entirely performed by the intestines, but in such a case any affection, however slight, of the intestines may be sufficient to cause death. Reichmann ⁶⁹ _{Feb. 14} calls attention to the bad results from the presence of undigested food in the stomach in cases of atrophy with absence of gastric juice, and the little that can be gained by giving HCl and pepsin. He has obtained good results with pancreatic preparations, using the stomach for intestinal digestion.

DILATATION.

The causes of dilatation of the stomach are: (1) obstruction to the egress of food at the pylorus or in the duodenum, (2) lack of muscular tone, and (3) the weight of large masses of food in polyphagia. A curious example of the first cause is reported by Pertik. ²⁰ _{Dec. 4, '88} A man 45 years old had a pouch of mucous membrane like the finger of a glove, about 8 centimetres (3 inches) long, communicating with and projecting into the duodenum, nearly filling its lumen. It may possibly have developed from one of the valvulæ conniventes.

That melancholia may be caused by gastric dilatation has already been pointed out by Leube. The following case is reported by Meyer, ²⁰ _{Feb.} in which severe mental disturbance undoubtedly preceded the changes in the stomach, and is suggested as a possible cause of the latter. The patient belonged to a family, many of whom were insane, and had himself passed several years in asylums. He had no severe gastric symptoms until a few days before his death. The autopsy showed such extreme dilatation that the stomach occupied nearly the whole of the abdomen, the small intestines being matted together and pressed into the pelvis. The liver, spleen, and pancreas were atrophied. The pylorus was wide-open, and the duodenum had taken part in the dilatation, the cause of which was

undoubtedly lack of tone in the muscular coat, possibly due to the patient's neurotic disturbances.

Another case of enormous dilatation is recorded by d'Astros.⁴⁶ _{Dec., '88} The stomach occupied the whole left half of the abdomen, the intestines being displaced and matted together. The pylorus had become occluded by the stretching of their gastric walls. The author calls attention to the fact that dilatation may be the cause of constriction or occlusion of the pylorus.

Klemperer⁸⁹ _{Feb., '88} reports an interesting case which shows that dilatation due to obstruction may be entirely cured if the cause is removed. A man 35 years old, with dilatation due to cicatricial stenosis, and finally complete occlusion of the pylorus from nitric-acid poisoning, had his pylorus resected. He made a good recovery, and the functions of his stomach became normal. Six months later he died of phthisis. His stomach had returned to its normal size and the mucous membrane was healthy. In the discussion on this case, Litten⁶⁹ _{Mar., '81} said that sulphuric acid will often cause destruction and cicatrization of the pyloric region without producing much, if any, damage to the rest of the stomach or to the oesophagus.

Mueller³⁰⁹ _{B. 13} reports 2 fatal cases of convulsions resembling tetanus, in cases of dilatation, in women between 40 and 50. In both cases the contents of the stomach were carefully examined for poisonous substances, but none were found.

Paliard⁹¹ _{No. 5, '88} describes another case of tetanic convulsions in a patient with dilatation and ulcer. She finally recovered after the use of emetics.

Klemperer¹⁰⁶⁰ has made a study of the relations existing between hyperacidity and gastric dilatation. In 17 cases of the latter, with no stricture of the pylorus, he found an excess of HCl in 8, a diminution in 7, and a normal amount in 2. In 21 cases of hyperacidity, 12 showed no signs of motor insufficiency, but presented the symptoms of nervous dyspepsia. In none of these cases was any dilatation. In the other 9 cases there was weakening of the motor power. In some of these the hyperacidity and motor insufficiency were due to the same cause; in the others hypersecretion was found. Dilatation due to lack of muscular tone may be produced by a torpid state of the vagus or the irritation of indigestible food, but not by hyperacidity. Hypersecretion may indirectly cause it by exciting spasmodic contractions of the pylorus.

ULCER.

Von Sohlern⁴ contributes a theory on the etiology of gastric ulcer. By sending inquiries to several physicians he finds that peptic ulcer is very rare in Great Russia and the Rhön and Alp districts of Bavaria, including a population of 25,000,000. Anæmia and chlorosis are common enough. The food is coarse; much hard liquor is drunk. The Russians drink much hot tea. There is difference enough in the climate, occupation, character, and food of the people of these different provinces except in one particular: they all live almost exclusively on vegetable foods, rich in potash salts,—a constituent of the blood of great importance. The author concludes that the richness of the blood in potash, carried by the red blood-corpuseles, acts in some measure as a preventive of ulcer. The grass-eating domestic animals very rarely have this disease,—an argument adduced by the author in favor of his theory, which is the first to show a definite connection between nutrition and ulcer. He quotes from a lecture of Ewald, who says that ulcer is frequently absent in hyperacidity; that when it is present HCl or other acids may be normal or diminished; that an altered blood state is a more constant concomitant than any other one thing.

Talma⁵⁸³ found by experiments on animals that gastro-malacia can take place during life from haemorrhages into the gastric walls and their digestion by the acids of the gastric juice. This occurs most markedly at the fundus. The round ulcer may result from this malacia, due to the same causes. He was also able to produce round ulcer by stimulation of the left vagus, lasting several hours. This causes spasm of the muscular coat, allowing the gastric juice to act on the mucous membrane. The situation of the ulcer so produced is always in the pyloric region. The author concludes that prolonged spasm of the stomach is often the cause of round ulcer in man.

Peabody⁵⁸⁴ reports an enormous ulcer in a man 30 years of age, a taxidermist, who had for a long time been in the habit of handling arsenic freely. The author suggests that this may have some bearing on the etiology. The ulcer involved the entire length of the lesser curvature to within half an inch of the œsophagus, and spreading extensively over the anterior and posterior walls. It measured $7\frac{1}{2}$ by 4 inches (19 by 10 centimetres).

A case of true tubercular ulcer is recorded by Musser.¹¹² It was produced by a submucous, cheesy, tubercular deposit breaking through the mucous membrane. Two more nodules were found not yet broken through. The ulcer had beveled edges, its floor was honeycombed, and it was surrounded by an area of thickening. The patient had general tuberculosis.

Ord⁵ recognizes two distinct forms of gastric ulcer. The first is deep and perforating, most frequently found in young women. The outline is round or oval, with a sharp edge and crateriform-shape. It may penetrate to various depths, opening vessels or perforating the stomach-walls. The site varies, but it is generally in the median zone, especially on the lesser curvature. The other form of ulcer is diffuse, comparatively shallow, with raised or overhanging edges, irregular outline, and uneven surface, and is found generally in the pyloric region. The first form occurs in anaemic young women, especially domestic servants. The subjects are often well nourished and are apt to be irregular in their catamenia. They are frequently the victims of acute rheumatism. The symptoms of this ulcer are: pain in one spot after eating; tenderness to pressure over the stomach, especially after a meal; vomiting, often followed by a relief of pain, and haematemesis. This symptom is very rarely continuous. The amount of blood is seldom small, generally coagulated, and, on account of its bulk, little affected by the gastric juice. The position of the ulcer may be inferred from the varying conditions of the pain and the attitudes of the patients during the paroxysms. Early vomiting and pain after eating indicate that the lesion is near the cardiac extremity. The patient will naturally try to get into a position in which the food presses as little as possible upon the tender point. The diffuse form of ulcer is found particularly in middle-aged persons, and occurs equally in both sexes. The subjects are often cachectic and wasted. The pain is less acute, but the vomiting much more frequent and distressing than in the perforating ulcer. The vomitus is intensely acid and often contains blood, either in the coffee-ground form or in small clots of different colors. In treatment, rest and a rigid diet are of the first importance. After a haemorrhage the bowels should be evacuated. The author has had very good results from iodide of potash in gastric catarrh, whether simple or complicating ulcer or cancer.

Cornils⁶⁹,_{p.755,758} gives an account of ulcer in his own person, and concludes that often no drugs are necessary. The diet should be unirritating, and be given in such a way that the stomach may have as much time as possible for rest. The bowels should be kept open, for which purpose Hunyadi water gives very satisfactory results

Byrom Bramwell,⁷⁶⁶,_{No.1, p.14} collaborator, directs attention to exaggeration of the epigastric reflex on the right side of the body in cases of ulcer, and suggests that this sign may, perhaps, prove of some diagnostic value.

Jaworski⁸,_{No.16, 78} has seen 4 cases of what he calls ectasia ventriculi paradoxa. After fluid had been poured into the stomach it could not be gotten out again. He suggests as a cause an hour-glass shape of the organ. Two such stomachs are reported, one by Mueller,³⁰⁹,_{p.13} where the second lobe had become elongated and twisted on its axis so as to obstruct the duodenum; the other case, by Fage,¹⁸⁸,_{Feb. 24} of a bilobed stomach, due to a cicatrix from an old ulcer.

Meyer³⁴,_{June 4} reports a curious case of perforation of the stomach opening into a cavity formed by inflammatory adhesions between the liver, spleen, intestines, and diaphragm. The cavity extended to the umbilicus, and contained 2 litres of fluid. There were no adhesions near the perforation, which was covered by the left lobe of the liver. From the symptoms this perforation probably occurred six weeks before death.

CANCER.

Steven²¹³,_{Dec. 30} reports a case of diffuse colloid and column-acelled epithelioma, involving part of the cardiac portion, part of the oesophagus, and spreading over the anterior and posterior walls, leaving the pylorus and part of the cardiac extremity free. The case is interesting on account of its possible etiology. The patient was a stone-mason, and for some years had been in the habit of standing nearly all day, pressing a long iron chisel against the stone, the blunt end of the chisel resting heavily against his left hypochondrial region.

Clarke⁹⁹,_{Aug. 8} reports a case of scirrhosis of the walls of the stomach, reducing its capacity to 4 ounces. There were 2 ulcers and the scars of 3 more. The clinical history pointed to the ulcers as the primary disturbance.

Zahn²⁰ has found records of 16 cases of secondary cancer of the stomach. To these he adds 2 more. The first was a case of mammary carcinoma with metastases in the pleura, aorta, diaphragm, pancreas, and colon. The pylorus was entirely surrounded by a thick, hard, cancerous ring lying in the muscular and submucous coats. The other case was secondary to carcinoma of the œsophagus. The walls of the stomach contained 3 small cancerous nodules.

Dutoit²¹⁴, describes a case of very hard, scirrhou, diffuse infiltration of the gastro-colic and gastro-splenic ligaments secondary to an ulcer of the fundus. The stomach itself was not involved.

The question of the cause of the disappearance of HCl from the gastric juice in cases of cancer of the stomach has been much discussed during the past year.

Rosenheim^{4, 24, 28} made a careful study of 16 patients with this disease. During life the contents of the stomachs were repeatedly examined, and HCl found wanting in 14. In all of these the autopsy showed well-developed atrophy of the gastric mucous membrane. In the other 2 patients the amount of HCl was increased during life, and in these cases after death the mucous membrane, except for the cancer, was found normal. The author concludes that the chemical insufficiency of the stomach in cases of gastric cancer is due, not to the cancer itself, but to the nearly constant concomitant atrophy. This alteration in the membrane may be divided into three stages—*inflammatory, interstitial, and atrophic*. Generally, all of these stages are present at the same time.

Ewald^{4, 2, 28} agrees that the absence of HCl in cases of cancer is not due to the cancer itself, but is merely an indication of a disturbance of the functions of the secreting glands. He has examined the mucous membrane of 3 cases in which the HCl had not been diminished, and found normal gland-tissue.

The differential diagnosis between cancer and ulcer by means of the amount of urea excreted is revived by Rauzier,³⁶³ who diagnosed a case of ulcer by the continued presence of a large amount of urea in the urine.

A decrease of urea would also be expected in malignant disease outside of the stomach, as in the following case, in which it was much diminished. Klemperer⁶⁹ diagnosed a tumor pressing upon and occluding the pyloric end of the stomach, and causing

dilatation, but not situated in it, by the following symptoms: Free HCl was present in large quantities. The tumor was easily moved up and down by respiration. Bile could get into the stomach, as was found by washing it out. This is very important for the diagnosis. In malignant stricture of the pylorus the contents of the intestines never break through into the stomach, whereas they seldom find any difficulty in doing so in cases of obstruction from other causes. The autopsy showed a cancer of the pancreas.

Ewald⁶⁹ _{No. 23} reports a case of occlusion of the cardiac orifice by a malignant growth. A gastric fistula was established and the patient fed through a cannula. As stomach digestion in cancer of the organ is generally destroyed, he recommends introducing the cannula through the pylorus directly into the duodenum, for which purpose the fistula should be as near the pyloric end as possible.

Leichtenstern⁶⁹ _{June 27} reports 3 cases in which the presence of cancer of the stomach was not suspected before death, although the patients were under observation in a hospital. One had metastases in the spinal canal, causing sudden paraplegia, from which he died. A scirrhus the size and shape of an ear was found just above the pylorus in the lesser curvature. None of the patients had ever complained of their stomach. In each case the tumor was found in the same place, and the gastric mucous membrane was normal.

DISEASES OF THE PANCREAS.

ACUTE PANCREATITIS.

With the exception of articles by Clässen, Klebs, and Friedreich, which were based on an insufficient number of sometimes doubtful cases, the literature of the subject has consisted almost entirely of occasional reports of isolated cases without attempt at classification or comparison of the facts presented. A complete picture, either clinical or pathological, of the disease has therefore never been given. This task has been undertaken by Fitz,⁹ _{Feb. 22} who gives, in an able and practical paper, a careful summary of all cases previously reported, together with a number of others which have never before been published. He has thus been able to collect 17 instances of haemorrhagic, 22 of suppurative, and 15 of gangrenous pancreatitis, besides 16 cases of haemorrhage into the pancreas. From these he draws the following conclusions:—

The evidence presented in this paper is intended to establish the fact that acute inflammation of the pancreas is both a well-characterized disease and one which is much more frequent than is generally thought. It is of great consequence that it should be recognized, for the following reasons: It represents a serious complication of what, by itself, is a relatively simple affection, viz., gastro-duodenitis; it is an important cause of peritonitis, and one readily overlooked; it has been repeatedly confounded with acute intestinal obstruction, and has thus led, in several instances, to an ineffective laparotomy,—an operation which, in the early stages of this disease, is extremely hazardous.

Method of Origin.—Acute pancreatitis commonly originates by the extension of a gastro-duodenal inflammation along the pancreatic duct. It may also be induced by the occurrence of haemorrhage in the pancreas. This may be of traumatic origin, although usually arising from unknown causes. The pancreatic haemorrhage may likewise be secondary to inflammation of the pancreas.

Pathological Anatomy.—The anatomical varieties are the suppurative, haemorrhagic, and gangrenous. The first may be acute, but is usually subacute or chronic. The second is generally peracute or apoplectiform. The gangrenous variety runs an acute course.

Suppurative pancreatitis may result in an evacuation of the abscesses into the stomach or duodenum, or they may open into the cavity of the great omentum, which, transformed into a large peritoneal abscess, may, in turn, open into the digestive tract. Pyophlebitis and abscesses of the liver may follow. Disseminated fat-necrosis is comparatively infrequent.

Haemorrhagic pancreatitis usually proves fatal in from two to four days. The gross lesions are then those of haemorrhage within and near the pancreas, extending into the subperitoneal fat-tissue, perhaps as far as the pelvis. Peripancreatitis may be expected, and disseminated fat-necrosis is common.

Gangrenous pancreatitis, although it may be secondary to a perforating inflammation of the gastro-intestinal or biliary tracts, usually results from a haemorrhagic pancreatitis, and proves fatal in the course of a few weeks. The gangrenous processes extend to the parapancreatic tissue, and produce more or less complete

sequestration of the pancreas. The peritoneal wall of the omental cavity becomes inflamed; that covering the pancreas may be destroyed, and the sequestered gland may lie in the omental cavity, soaked in pus, and attached only by a few shreds. Both pus and pancreas may be discharged into the intestines. Splenic thrombo-phlebitis is not uncommon, but hepatic abscesses are rare. Disseminated fat-necrosis is frequent.

Symptoms.—The common symptoms of acute pancreatitis are sudden, severe; there is often intense epigastric pain, without obvious cause, in most cases followed by nausea, vomiting, sensitiveness, and tympanitic swelling of the epigastrium. There is prostration (often extreme), frequent collapse, low fever, and a feeble pulse. Obstinate constipation for several days is the rule, but diarrhoea sometimes occurs. If the case does not end fatally in the course of a few days recovery is possible, or a recurrence of the symptoms in a milder form takes place, and the characteristics of a subacute peritonitis are developed.

Diagnosis.—The symptoms are essentially those of a peritonitis, beginning in the epigastrium and occurring suddenly, during ordinary health, without obvious cause. The diagnosis, therefore, is based on pain, tenderness, and tympany limited to the region of the pancreas, and on the gradual development of a deep-seated peritonitis in the same place.

Differential Diagnosis.—The differential diagnosis lies, practically, between an irritant poison, perforation of the digestive or biliary tract, and acute intestinal obstruction. An irritant poison is excluded by the history of the case and by the examination of the vomit.

Perforating ulcer of the stomach or duodenum is to be excluded by the absence of pain after eating, haemorrhages from the digestive canal, and cachexia. Acute perforation of the transverse colon is rare, and the resulting peritonitis progresses more rapidly, and is likely to be general. Perforation from gall-stones is usually preceded by attacks of biliary colic and jaundice, while the seat of the pain is rather in the region of the gall-bladder than in that of the pancreas.

Acute intestinal obstruction is most likely to give rise to doubt. It is to be eliminated by determining through injection the patency and capacity of the large intestine, by the rarity in the

epigastrium of an obstructed small intestine, by the immediate presence of localized tenderness, and by the usual absence of a conspicuous general tympany or limited distention of intestinal coils.

Treatment.—It is evident that treatment, at the outset, can only be palliative. With the formation of pus in the omental cavity comes the opportunity for the surgeon. The possibility of the successful removal of the gangrenous pancreas is suggested by the healthy condition of a patient seventeen years after he had discharged this organ from his bowels.

CHRONIC PANCREATIC DISEASES.

Interesting contributions to our somewhat scanty knowledge of the symptomatology of chronic pancreatic disease have been made by Van Ackeren,⁴ and T. J. Walker.² The former reports a case of carcinoma of the pylorus, in which two large cancerous glands were found occupying, respectively, the head and tail of the pancreas. Nothing especially remarkable was noticed in the history till about two weeks before death, when the quantity of urine suddenly increased and the specific gravity rose to 1028 and 1030. A careful clinical examination showed the presence of maltose, as well as a second form of sugar, the composition of which could not be determined owing to the small amount obtainable. Indican was found in considerable quantity, but no bile-pigment, nor was any excess of fat discovered in the faeces. Striped muscular fibres were, however, abundant, and, as they have been found in the faeces of nearly every similar case hitherto reported, their presence is of considerable diagnostic value when attributable to absence of trypsin and not to the too rapid passage of food through the intestinal tract. No importance, on the other hand, can be attached to the presence or absence of fatty stools. As Friedr. Müller has already pointed out, they may appear in a variety of intestinal diseases, while affections of the pancreas do not of themselves lead to any disturbance in fat absorption, but only to a greatly-increased proportion of neutral fats over the fatty acids and soaps discharged from the bowels. Musculus and von Mering have shown that the pancreatic juice possesses by far the strongest diastatic action of any of the digestive ferments, and probably is alone responsible for the final reduction of maltose into grape-sugar; yet the only symptom of any disturbance in the

behavior of the carbohydrates in the organism due to changes in its quality or quantity is shown by their excretion in the urine in the form of sugar. This has been supposed to be glucose from its response to the ordinary tests, but this case, in connection with one mentioned by Le Nobel, ¹⁰⁸⁰_{p.151,75} makes it extremely probable, however, that it is not grape-sugar which is excreted, but some form not fully reduced, *e.g.*, maltose. Although no positive conclusions can be drawn from these two cases, the presence of unreduced carbohydrates, especially maltose, in the urine, when other symptoms point to the pancreas, may serve as corroborative evidence of no mean value.

Walker calls attention to another symptom which he considers of considerable importance, namely, the persistent absence of color in the faeces without jaundice. This condition was present in 2 cases recently under his observation, in which the diagnosis, made during life, of obstruction to the pancreatic with a healthy condition of the hepatic duct, was confirmed by the autopsy. From these cases he concludes that the coloring matter of the faeces is dependent on the mutual reaction of the bile and pancreatic fluid under the influences to be found in the intestinal tract, and that in disease colorless stools may be due to a deficiency of the latter as well as of the former; moreover, if that portion only of the bile is excreted which is converted into brown coloring matter by the aid of the pancreatic juice, then it must play an important part in determining what proportion of the bile is to be re-absorbed and what eliminated with the faeces.

PANCREATIC CYSTS.

Lindner ⁵⁷_{Feb. 24} reports a case of pancreatic cyst occurring in a woman of 30 years of age. For seven or eight weeks she had suffered from severe digestive disturbances, with intense paroxysmal abdominal pain and rapid emaciation. Physical examination was negative except for a sense of resistance in the region of the stomach. Ten days later a large tumor could be felt in the epigastrium. Laparotomy was performed, and the walls of the cyst were stitched to the edges of the abdominal wound, recovery ensuing. The cyst contained a litre and a half of dark, reddish liquid, which emulsified fats and changed starch into sugar, but did not peptonize albumen. Its etiology was somewhat doubtful, but was probably trauma, as she was the wife of a butcher, and

was accustomed to brace the end of the bone-saw against the epigastrium. It is easily conceivable that the constant repetition of this pressure through abdominal walls abnormally lax from ten pregnancies might lead to the inflammatory closure of larger or smaller ducts and thus to the formation of cysts,—an hypothesis which is borne out by the character of the contained fluid.

A second case is reported by Thompson.¹ _{Apr. 13} The patient, a woman 55 years old, had complained of more or less digestive disturbance for two years, and for six months had noticed a tumor in the region of the epigastrium which had gradually increased in size. The tumor was movable, varied somewhat in size, and on one occasion was distinctly tympanitic. There was no jaundice, but the stools were clay-colored, and a profuse diarrhoea set in a few weeks before death. At the autopsy a hard, scirrhouous mass was found occupying the head of the pancreas, while connected with it was a cyst which held about 2 quarts of fluid when distended, and was connected by large openings with both the duodenum and the colon. There were no secondary deposits.

The table of cases which appeared in the last ANNUAL will be rendered more complete by the addition of the following, which are quoted by Lindner:—

Lardy,²¹⁴ _{No. 9, 23} male, aged 37. Repeated attacks of abdominal pain had occurred for one year, with some discomfort during the intervals, and later frequent vomiting. There was no icterus, but the faeces were lighter than normal in color. Recovery followed incision and drainage.

Wölfler,⁴⁰⁵ _{v. 9, p. 115} female, aged 21. For two years following a gastro-enteritis an enormous tumor had been developing in the epigastrium. After operation extensive gangrene of the cyst-wall came on, but recovery finally took place.

Nichols,¹ _{v. 4, p. 55} male, aged 49. For twelve years there had been recurrent attacks of severe epigastric pain, with fullness in that region, but without digestive disturbance; for seven years there had been occasional vomiting of "coffee-ground" material, while for three a tumor had been present, with diabetes. Operation was refused and the patient died. A cyst holding 4 quarts was found at the autopsy, but no trace of glandular structure. Gläser's⁶⁹ _{p. 640, 87} case also belongs here, as the history suggests that it was originally one of pancreatic cyst which had later suppurated.

DISEASES OF THE LIVER.

PHYSIOLOGY.

Roger¹¹ _{Sept. 18} has recently repeated and elaborated the investigations of Schiff, Hegar, Jacques, and Lauterbach regarding the action of the liver on poisons, and has arrived at very similar results. He determined that that organ arrests a certain portion of the nicotine, cicutine, morphine, quinine, hyoscyamine, and strychnine which are brought to it by the portal vein, and diminishes the toxicity of peptone and the poisonous products of decomposition, whether arising from the exposure of food to the atmosphere or developed from it in the intestinal tract. It exerts also a similar action on the salts of iron and copper and the ammoniacal salts of the organic acids, while ethylic alcohol is but little affected, and glycerin, acetone, and the salts of sodium and potassium not at all. This action thus seems to be an elective one, and not simply the result of dilution in the mass of blood contained in the hepatic capillaries. By inducing in animals various lesions of the liver, such as cirrhosis by ligation of the cystic duct, fatty degeneration by the exhibition of phosphorus, or the various disturbances following section of the pneumogastrics, it is shown that this function of the liver varies directly with its richness in glycogen. In starving rabbits its activity diminished so long as they were deprived of food, but immediately recovered as soon as substances capable of producing glycogen were supplied them. This protective rôle is apparently only a particular instance of the power of the liver to act on certain organic substances, such as glucose and egg-albumen, which was demonstrated by Claude Bernard; but, whatever it may be, it has a two-fold importance,—it guards the system under normal conditions against the toxic products of intestinal putrefaction, and also plays an important part in those diseases—especially the infectious—which lead to the development of toxic products.

Ponfick²⁰ _{Nov.} succeeded in removing as much as three-fourths of the liver-substance from guinea-pigs without severe and lasting disturbances or death necessarily resulting. The remaining portion gradually enlarged to about the normal size of the organ, occasionally even exceeding it. The histological appearances of the restored portion are to be communicated later.

ICTERUS.

A case of infectious icterus is reported by Chauffard,³ in which, in spite of the development of the severest symptoms, a good prognosis was correctly given, because it was established by various tests that the hepatic cells, far from being in danger of destruction and death, were in a condition of functional super-activity. The formation of bile was increased, as shown by a poly-cholic diarrhoea, while an analysis of the urine showed that urea was excreted in large amounts. The glycogenic function also remained intact, no trace of sugar appearing in the urine after the injection of a large amount. The clinical history of the case strongly resembles the cases of so-called Weil's disease, but Chauffard can see no reason for the creation of a new disease. No specific agent, either bacterial or chemical, has been discovered as its cause, nor does its course differ so greatly from other forms of infectious icterus as to entitle it to rank alone. He proposes, therefore, the following classification of acute infectious icterus, which, though simply provisional, and based unfortunately on pathological physiology and the clinical history rather than on its pathogenesis, is still useful from a prognostic stand-point, as well as sufficiently inclusive to dispense with the necessity of creating new diseases:—

1. Primary icterus gravis, accompanied by the anatomical and biochemical destruction, either permanent or temporary, of the hepatic cell. 2. Benign infectious icterus, in which the biochemical functions of the liver are either normal or exaggerated. This may be further subdivided into simple catarrhal icterus, infectious catarrhal icterus, infectious icterus with polyuria, and infectious icterus with relapse.

The use of the faradic current in catarrhal jaundice, as recommended by Gerhardt in 1871, is warmly indorsed by Kraus,¹⁵⁸ B.10, H.3,4 who reports 17 cases, all children, in which it was successfully employed. Improvement began to be manifest after three or four applications, and seven or eight were all that were necessary to effect a cure. It was administered every day for five months, either by placing both electrodes over the region of the gall-bladder, or with one over the gall-bladder and the other at an opposite point on the back to the right of the vertebrae. In 1 case, a weak and anaemic child, the first application produced a convulsive tremor of the whole body which lasted for several hours, but

with this exception no accident occurred. The success of this method is without doubt due to a tetanic shortening of the smooth muscular fibres of the gall-bladder, which causes an evacuation of its contents either by diminishing its size or by increasing its peristaltic movements.

Goodhart,² from a uniform success in 6 cases, recommends the subcutaneous injection of hydrochlorate of pilocarpine for the relief of itching in patients with jaundice. Witkowski,⁷⁸³ _{May, 1898} ²⁹, after an experience with 30 cases, is even more enthusiastic in commendation of the drug which he considers almost a specific in cases of simple hepatogenous jaundice not due to new growths in the liver. All subjective symptoms are relieved after the first injection, while catarrh of the stomach, duodenum, and bile-ducts and jaundice disappear in from one to three weeks. If no improvement has taken place in the course of ten or fourteen days, a fairly certain diagnosis of malignant disease of the liver may be made. About $\frac{1}{6}$ grain (1 centigramme) should be given once or twice daily, the dose being increased one-half after the fourth or fifth day.

CIRRHOSIS.

Etiology.—Podwyssozki⁵⁰ attributes considerable importance to the coccidia in the causation of certain forms of chronic inflammation, especially hepatic cirrhosis. They are found either isolated or in small groups in the cells or in their nuclei, and, by causing hypertrophy and deformity of the latter, finally lead to their complete destruction with pigment atrophy of the cell. This destruction, together with the irritation produced by the coccidia themselves in the inter-lobular and intra-lobular connective tissue, becomes the direct cause of cirrhosis. From their analogy to the parasites found by Steinhaus in the epithelial cells of the intestine of the salamander, and called by him *karyophagus salamandræ*, Podwyssozki has named them *karyophagus hominis*.

Prognosis and Treatment.—The possibility of hepatic cirrhosis terminating in recovery has received much attention during the past twelve months, and, in addition to the comparatively large number of instances already reported in which it has taken place, cases have been recorded by MacDonald,⁹ Millard,¹⁶⁴ M. P. Jacobi,⁵¹ Troisier,³ _{Dec. 19, 1898} Hallopeau,³ _{Dec. 19, 1898} Joffroy,³ _{Dec. 19, 1898} Petrone,³ _{Oct. 30} and others. Although some of these cases are undoubtedly of syph-

ilitic origin, they are still sufficiently numerous to prove that a fatal result does not necessarily ensue, even after the development of the most characteristic symptoms. As suggested by Millard, the course of the disease may be divided into three periods: (1) a stage of enlargement due to engorgement and infiltration with embryonic cells, from which recovery is usual; (2) a period of circulatory disturbance and ascites from a further development of the first stage, but still capable of resolution; and (3) a necessarily fatal condition of atrophy.

The remedies employed have been various. Semmola, ⁵⁷ _{Jan. 6, 18} during the fourteen years which have followed his recommendation of a milk *régime*, has had his confidence in its efficacy confirmed, and has seen the severest symptoms improve; enlarged subcutaneous veins have diminished in size, ascites has disappeared, and the urine has increased in amount. Even when complete recovery was impossible considerable improvement has taken place. The prognosis depends on the amount of urea excreted during the twenty-four hours, an increase giving a much more favorable outlook than a decrease, as the quantity which is secreted corresponds, according to him, with the functional activity of the hepatic cells, the amount of nitrogenous metabolism being proportionate to the number of those normally active. Exception must be made, however, to cases of malarial origin, in which the results have always been unsatisfactory. Jaccoud, ³ _{Feb. 13} however, has found that the success or failure of a milk diet, in both the atrophic and hypertrophic forms, was dependent on the amount of compression exerted on the portal vein. But little is to be expected if the abdomen refills very rapidly after aspiration. Improvement has also been found to follow the use of calomel, iodide of potassium, and enemata of oxygen.

A case is reported by de Brun ⁹² _{Dec. 10, 188} which differs from most of the others in that there seems to have been a slight diminution in the size of the liver. The patient, an alcoholic subject, was reduced to a condition of extreme emaciation, while the ascites was very great, and re-accumulated very rapidly after aspiration, which had been twice performed. A third puncture seemed inevitable, when suddenly the fluid began to be absorbed, and in seventeen days it had entirely disappeared. Two weeks later he left the hospital entirely cured, and has remained well since,—a period of four

years. The possibility of syphilis is carefully considered by de Brun and dismissed as untenable. The treatment consisted at first of small doses of iodide of potassium, with tonics and diuretics and partial milk diet. At the time of his rapid improvement he was taking caffein only.

For the sensational details of the following case, Duhamel¹⁶⁸ is responsible. The patient had suffered from alcoholic cirrhosis with ascites for several years, and had been frequently tapped with only temporary relief. After the fifty-third aspiration he was allowed, at his own request, to drink about 8 ounces of the ascitic fluid. The effusion did not recur, and in five or six weeks he was able to leave the hospital. Improvement has so far been permanent.

Somewhat unusual causes of death in cirrhosis, the bursting of œsophageal varices, are recorded by Glover,⁷ Mosny,⁷ and Hektoen.⁷⁹

ACUTE YELLOW ATROPHY.

In a graduation thesis, Martinez⁷⁷³ discusses the possibility of acute yellow atrophy terminating in recovery. Cases seem to be much more common in Cuba and other tropical countries, as well as more frequently idiopathic in nature, than in more northern climates, for, while only 1 case is said to have occurred out of 27,500 admitted to the London Fever Hospital, 58 have been received in the Civil Hospital of Havana during a period of ten years. In the Paula Hospital, however, which is reserved exclusively for women, 2 cases only were admitted during the same period; so that it appears to be much more frequent among men than among women. The statistics of the Havana Civil Hospital show that it is by no means necessarily fatal, as there have been 11 recoveries besides 1 which was returned as improved. Martinez doubts if treatment is ever very effectual, but considers the main indications to be met at first by cathartics and later by tonics.

Rosenheim¹¹⁴ reports 2 cases, one of which occurred in a girl 10 years old, where a bacteriological examination proved absolutely negative. As this has been the result in a majority of the most carefully studied cases, it seems probable that the cause is of a chemical nature, but whether or not the product of bacteria in the intestines or elsewhere is not yet determined. It seems to bear a very close analogy to the condition called lupinosis, which Roloff

and Munk have shown to be due to a chemical agent which can be extracted from the seeds of the lupini.

Another case, which may be briefly mentioned from the extreme rarity of the disease in children, is reported by Foltanek,⁸ _{Apr. 11} the patient being a boy 12 years old. The symptoms did not differ from those presented by adults.

Friis³⁷³ _{No. 31} reports 2 cases of acute yellow atrophy of the liver, which were caused by syphilis. Jaundice first appeared three months after infection, and two weeks later was followed by death. Both patients had been under regular treatment by mercurial inunctions. The diagnosis was confirmed by autopsy.

SUPPURATIVE HEPATITIS.

Geigel¹¹⁴ _{B.16, H.3, 4} reports a case which is interesting in being the only one in which spontaneous cure has resulted when the diagnosis admits of no reasonable doubt. The patient, a lady 66 years old, suffered from an attack of biliary colic which had been preceded for a few days by chills. They also occurred in the ten days following the attack, and were accompanied by a considerable elevation of temperature. Jaundice was present for two days. The liver was considerably enlarged, and on its surface two tumors could be felt which were about the size of a silver dollar, circumscribed, resistant, and tender. Over the one in the left lobe the skin was œdematosus and doughy, and perihepatitic friction could be felt. Applications of ice were continued till the tenth day, when warm poultices were substituted, and were followed by a rapid disappearance of both local and general symptoms. In the treatment of the case the methods usually recommended—bleeding, purging, etc.—were entirely discarded, as he considers that the indications are best met by keeping the intestines and their associated organs as quiet as possible, in order to prevent the development of other inflammatory foci. Reliance should therefore be placed on poultices and opium, with prolonged rest in bed and sufficient Vichy water to wash out the biliary passages.

Etiology.—A report of a second case is contained in Geigel's paper, which throws considerable light on the connection between gall-stones and hepatic abscess. At the autopsy several calculi were found, the largest of which had become impacted in the ductus choledochus, and by pressure on the portal vein had led to

the formation of a thrombus. This had later broken down and become the source of multiple abscesses. The cause of the pus formation in the thrombus is readily understood if it is remembered that the gall-bladder, as well as the larger bile-duets, pour their venous blood into the vena porta and not the vena cava. In the present case the mucous membrane of the gall-bladder was in a state of acute inflammation.

An attempt to explain the connection between dysentery and hepatic abscess is made by Kartulis,²⁰ who has had a very large experience with both diseases in Egypt. In the intestinal ulcers of over 500 cases of dysentery which he examined, as well as in every case of abscess of dysenteric origin, amœbæ (*proteus vulgaris*) were discovered, while they could not be found in abscesses due to other causes. In some instances, indeed, the pus was nearly a pure culture. As amœbæ have been found in dysentery, and in the abscesses secondary to it, in Egypt, India, and several parts of Europe, he is convinced that in those places, at least, both conditions are dependent on the presence of these parasites. They probably act as carriers of bacteria or other pus-producers from the intestines, as it is doubtful if they are themselves able to excite suppuration. The impossibility of obtaining pure cultures has greatly complicated the problem. He would draw a sharp distinction between dysenteric and idiopathic tropical abscesses which are due to pyogenic micro-organisms coming probably from the gastro-intestinal tract.

Younge²² also insists on this distinction, but considers the relative proportion of the former to the latter to have been greatly overestimated, and cites Waring's 300 cases, in which only 27 per cent. were due to dysentery, as well as Parke's series, in which the proportion was only 21.74 per cent. It is, moreover, universally admitted that there is no tendency to hepatic abscess in the dysentery of temperate climates. He summarizes the chief differences between the two as follows: Dysenteric abscesses are the result of purulent phlebitis, excited by the lodgment of septic thrombi. They are small, usually numerous, and are connected with the branches of the *venæ portæ*. They are always fatal, and no operative interference is justifiable. Tropical abscesses are large, usually single, and occur in connection with the branches of the hepatic artery. They are due to the breaking down of a com-

paratively healthy inflammatory effusion, and an early operation is necessary, and is frequently successful.

The usual etiological factors are those which produce liver exhaustion, the most important being the blood deterioration, occurring as the result of prolonged exposure to great atmospheric heat, and leading to an increased destruction of the red corpuscles, which may be further accelerated by attacks of malaria. The liver is thus severely taxed to convert the albuminous elements into urea and the coloring matter into the pigment of the bile and urine, while it is at the same time called upon to excrete a large amount of the hydrocarbons, which, in temperate climates, passes off by the lungs. The liver consequently becomes congested, and the blood within it impure from unexcreted biliary elements and ptomaines absorbed from the disordered stomach and intestines, while its nutrient vessels are blocked with dead corpuscles, all of which conditions are favorable to the development of inflammation if an exciting cause is found. This, he believes, is always chill, but alcohol, excessive use of nitrogenous food, lack of exercise, or a scorbutic taint may act as accessories.

Treatment.—Vaughn Harley⁶⁴⁵ records the success of an improved method of treatment of liver-abscesses in two of the worst forms of the disease, one occurring in a man aged 29, and associated with septic absorption and blood-poisoning, and the other a case of multiple strumous abscesses in a boy of 17. Both were emptied and healed within five weeks after treatment was begun. An exploring cannula 8 inches long is to be passed into the liver obliquely from right to left, or *vice versa*, according to the supposed position of the abscess, and allowed to remain in position until pus ceases to flow; it should then be replaced by one of the diameter of a No. 8 or 10 English catheter, introduced in exactly the same direction and to the same depth, and through this the abscess should be completely evacuated with the aid of an aspirator. The cavity should be washed out with tepid water, containing 10 grains (0.64 gramme) of boracic acid to the ounce (30 cubic centimetres), till the solution returns sweet and clear. A silk-elastic catheter as large as will pass through the cannula should then be inserted and securely fastened, the extruding end being cut off to within 1½ inches (3 centimetres) of the abdominal wall. The irrigations should be repeated night and morning, and hot, sloppy poultices applied till

the discharge almost entirely ceases. A counter-opening, by allowing more thorough washing out, greatly hastens recovery. The advantages of this method, according to Harley, are, first, that in boracic acid we have a thoroughly safe and yet sufficiently efficient antiseptic; second, that daily irrigation with it greatly expedites a cure and completely does away with the necessity for a large opening, whereby the healing process, other things being equal, is proportionately hastened.

Ortiz⁷⁸⁴ reports a case of hepatic abscess in which recovery occurred after a large incision. Rusche^{4, Sept. 30} successfully treated two large abscesses of the liver in an infant 3½ months old by incision and drainage. They were attributable to a thrombosis of the *venæ portæ*, secondary to thrombosis of the umbilical vein.

HYDATID CYSTS.

The lack of unanimity in the profession in regard to the best method of treatment in cases of hydatid cysts, and the amount of attention which this subject has occupied in the journals, make the summary, given by Thomas,^{285 June, Aug.} of the results which have been obtained by the various means of cure especially timely and interesting. He says that it is almost impossible, at present, to accurately estimate the real value of those operations for the cure of hydatid disease in which the mother-cyst is not removed, viz., tapping operations, the use of parasiticide injections, and electrolysis, inasmuch as the apparent cure, which often follows, is frequently found, after the lapse of a short time, to be illusory.

As regards tapping operations, there is reason to believe that they fail to cure the patient in fully 40 per cent. of the cases in which they have been tried; indeed, it is probable that the actual proportion of failures is much greater than is represented by that number.

Taking aspiratory punctures and ordinary tapping operations together, the deaths amounted to nearly 18 per cent., but the mortality following aspiratory puncture, whether single or multiple, was only about half that of punctures with an ordinary fine trocar. Speaking generally, the greater the number of punctures required in a given case, the smaller is the probability of the cure of the patient by tapping alone.

Simple puncture, although generally devoid of risk, has been

known to cause sudden death, sometimes apparently from shock, sometimes, however, in the case of pulmonary hydatids, from suffocation by the fluid contents of the bladder-worm. The objection to puncture as a mode of treatment for internal hydatids, however, lies less in the occasional perils of the operation than in its frequent inefficacy.

Of the use of parasiticide injections into the sac and the employment of electrolysis, it may be asserted that there is at present no evidence in favor of these methods of treatment that does not apply equally forcibly to simple puncture; and, moreover, each possesses drawbacks of its own.

The question of choice between the various forms of radical operation is, at any rate, for abdominal hydatids, simple, for their mortality is widely different, as a reference to the following table will show:—

MORTALITY OF VARIOUS RADICAL OPERATIONS.

Caustics,	33.68 per cent.
Canule-à-demeure,	26.66 "
Simon's method,	48.00 "
Volkmann's method,	19.05 "
Lindemann's method (abdominal sections), . .	10.29 "
" " (thoracic incisions), . .	29.41 "

With regard to hydatids of the liver, or of the lung, which have ruptured into the pleura, thoracentesis is the only resource which offers itself.

Unruptured echinococcus cysts of the convexity of the liver present great difficulties in their successful treatment, for thoracic incisions show a high rate of mortality.

Other observers are, however, less sanguine than Thomas regarding the perils of aspiration. Krause⁴ has seen a case in which it was followed by the formation of multiple cysts in the abdomen, and would avoid, so far as possible, even puncture with a hypodermic needle for diagnostic purposes. Two cases²⁸⁵ are also recorded elsewhere in which it was the cause of death. In 1 case, a girl aged 14, rigors, high temperature, and death in a few days followed the withdrawal of 26 ounces of blood-stained fluid. At the autopsy it was found that the inferior vena cava formed part of the wall of the cyst, and had given way, permitting free communication between the vein and the cyst. In the second case death occurred from collapse on the following night, the trocar having passed

through a vein in the omentum which was adherent to the lower border of the liver, and caused fatal haemorrhage.

Two cases recorded by Morris,⁶ in which recurrence took place two and one-half and three years, respectively, after the operations, show that even after laparotomy such an event is not impossible.

Semeleider,¹⁷⁹ *July*, corresponding editor, Mexico, records a case of multilocular echinococcus cysts in a young Englishman, who had probably brought the disease with him into Mexico. The patient died. It is mentioned as a strange coincidence that his father and one uncle died of hepatic abscess, while another is now suffering from a hard swelling in the liver.

Rasmussen³⁷³ *Nov. 9, 10* records a case of icterus in a pregnant woman, leading to miscarriage and death, which was caused by a bit of membrane from an echinococcus cyst blocking the ductus cholangius. The membrane came from a suppurating hydatid cyst situated in the right lobe of the liver.

GALL-STONES.

A. Depage,²⁷⁶ *No. 24, '98* in the course of a paper upon "Surgical Intervention in Biliary Lithiasis," says that he has been able to collect reports of 78 cases upon which cholecystotomy has been performed. Of these operations 6 were done according to the method of Spencer Wells, and 72 with suture of the gall-bladder to the abdominal wound. Of the first-named 6 cases, 3 died from acute peritonitis, 1 cured case was followed by recurrence, and 2 cases were completely relieved.

Of the second series there were 11 deaths—5 from haemorrhage and collapse, 2 from biliary retention, 2 from effusion of bile into the peritoneum, and 2 from undetermined cause; there were also 4 deaths from secondary complications.

Among the "cures" are 24 cases of biliary fistulæ, some permanent. The number of cholecystectomies has been 22, with 2 deaths from obstruction of the bile-duct and 1 after recovery from operation from a cause independent of biliary lithiasis. Thus, in cholecystotomy with suture of the gall-bladder and its free return to the abdominal cavity, a mortality of 50 per cent. resulted; in cholecystotomy with suture of the bladder to the parietes, 15.27 per cent., and in cholecystectomy, 9.99 per cent.; and, as the last-

mentioned figure includes the 2 cases of permanent occlusion of the common bile-duct, the result, if they be excluded, greatly enhances the position of cholecystectomy.

The treatment by large doses of olive-oil, which several years ago appeared and disappeared like a comet, has apparently completed its cycle and again becomes the object of a great deal of attention. In the French journals there have even been signs of considerable ill-feeling among those who claim the honor of first heralding its approach. The list of those who have seen its administration followed by relief includes Thomayer, of Prague,¹⁰⁹ July Hoehling,⁶¹ Aug. 31 Saunders,¹⁹⁶ Feb. Durand,¹⁸⁸ Mar. 17 Arnozan,¹⁸⁸ Jan. 13 Brennan,¹²² June De-lorme,¹²² June Mears,⁶ Dec. 29, '88 and Moriez.¹⁷⁵ Dec. '83 It proved worthless, on the contrary, in the hands of Dubois,²³⁰ May Marciguey and Boymond,³⁵ Mar. 14 and Kishkin,¹⁰⁹ Oct. while Verdalle¹⁸⁸ Feb. 10 succeeded only in producing insurmountable disgust and vomiting. Abeles warns⁸ Jan. 10 to 24 against its use in cases with icterus on account of the danger of increasing the digestive disturbances already present, and Porter,⁸² Dec. 5, '88 though admitting that it may be of value on account of its moist heat, says that it should be abandoned because it implies a special virtue in the oil which it does not possess, a reliance on which tends to prevent the use of rational methods.

Rosenberg¹¹⁶ Dec. suggests that, on account of the importance of bile in the digestion of fat, a large increase of the secretion takes place when fat in excessive quantity is administered. He had seen the administration of fat give rise to a greater increase of bile than did the digestion of albumen and carbohydrates,—two dogs with permanent biliary fistulæ being employed for the experiment. He considers that the oil acts, not by dissolving the concretions, but by washing them out. To overcome the tendency to vomiting occasioned by the administration of the oil he advises the addition of .25 per cent. of menthol, 10 to 15 per cent. of cognac, and the yolks of 2 eggs to each dose. The dose of oil recommended is from 4 to 6 ounces (124 to 187 grammes), which should be taken in from 6 to 8 portions within from two to three hours. The mouth may then be washed with vinegar and water, and hot, strong, black coffee be taken afterward. He reports excellent results from this procedure.

The treatment of biliary concretions by digital manipulation, which was advocated by Geo. Harley and reviewed in the last issue

of the ANNUAL, has been used in 2 successful cases by Wylie,² who says that he could feel that he was pressing out the contents of the gall-bladder. His method, however, was slightly different from Harley's, as he thrust the fingers of the left hand deep into the abdomen while pressing on the fundus of the bladder with his right hand.

Comingor⁸¹ succeeded in overcoming the obstruction in a case which had lasted eleven weeks by what he calls "pumping the liver." He "proceeded by placing his hands on the ribs over the liver, making firm and quick pressure, letting up, and repeating, say, for five minutes." The process was repeated two or three times during the night. Up to that time no trace of bile had appeared in the dejections. The following day a large quantity of dark, bilious matter passed from the bowels, soon followed by scores of gall-stones. Improvement continued for about a fortnight, when the duct again became blocked and the pumping process was once more resorted to, with the same favorable result. The patient made a complete recovery.

The question of the relationship between gall-stones and primary carcinoma of the gall-bladder is discussed by Zenker,³²⁶ B.44, H.2.3 who bases his conclusions on an analysis of 48 cases, 8 of which are from the records of the Institute of Pathological Anatomy at Erlangen. Both clinical and anatomical experience supports the view that in the majority of cases calculi precede cancer and lead to its development in the scars and ulcers which they cause, in the same way that gastric ulcer predisposes to cancerous growths in that organ. Hauser's classical researches have shown that in the latter case the process of cicatrization excites an atypical glandular growth, which, in persons so disposed, passes by gradual changes into carcinoma.

Very similar conditions were found by the microscope to exist in one of Zenker's cases, in which the process of cicatrization appeared to advance *pari passu* with an atypical growth of the epithelial elements, not only in the gall-bladder, but also in the adherent transverse colon, cystic duct, and portion of the liver. The continual irritation of the calculi may serve as the immediate cause in stimulating such growth to excess, where a predisposition exists from the preponderance of the epithelial element in the histogenetic balance so common in elderly persons.

MELANOSARCOMA OF THE LIVER.

The rare mention of melanosarcoma of the liver in the periodical literature of the last ten years is probably due to the fact that it is almost always secondary to a sarcoma of the eye, from which metastases are at the present day prevented by earlier diagnosis and operation. In a case reported by Litten, ⁶⁹ _{Jan. 17}, however, operation on the primary growth proved unsuccessful, death occurring four years later from exhaustion. The most striking feature of the case was presented by the urine, which was perfectly colorless when passed, but which turned black after exposure to the air for several hours. This reaction could be immediately produced by adding nitric or chromic acid. Another peculiarity consisted in its always undergoing acid decomposition, but never alkaline. Moreover, if the urine was rendered alkaline and copper sulphate added, according to the usual method of performing Trommer's test, an orange color was produced, without, however, the formation of a precipitate, while, if grape-sugar were also added, no reaction took place.

So far as can be judged from the current literature of the subject, melanuria seems to be so nearly constant a symptom of melanosarcoma as to be of considerable value in the diagnosis of obscure cases, unless those only have been published in which this symptom occurred. As Virchow has pointed out, it has never been noted by ophthalmologists; so that there is good reason to believe that it only appears when metastases have occurred in the internal organs, especially the liver. It is not, however, pathognomonic, as Litten mentions an instance where it occurred in peritonitis without cancer, and refers to a similar case of Senator's.

Targett ² _{Apr. 20} showed to the London Pathological Society a very unusual specimen of the liver coming from a man aged 62. The greater part of the organ was replaced by fibrous tissue, which was infiltrated by calcareous deposits till it had become so hard that it had to be sawed into sections. It weighed 66 ounces. There was no caseation, no gummata or evidence of parasites, nor was syphilis or alcoholism mentioned in the clinical history. Ascites was not present, but the veins of the upper abdomen and chest were dilated. Jaundice did not occur until two days before death, which was from facial erysipelas. The thickening of the capsule,

together with the amount of fibrous change in the interior of the organ, suggested that the primary changes were due to syphilis, but there was none of the cicatricial contraction so commonly found in old syphilitic livers.

DISEASES OF THE INTESTINES AND PERITONEUM.

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DIARRHŒA.

Etiology.—The conclusions of Ballard⁶ as to the nature and causes of epidemic diarrhoea are that the disease is a veritable specific disease of a febrile nature, and followed very soon, in bad cases, by pronounced lesions, especially of the eliminative organs: the stomach and intestines, the epithelium of which is shed; the kidneys, which become affected with glomerular nephritis; the liver, which becomes fatty; and the lungs, which are affected with lobular pneumonia. Pathologically, the disease is most comparable to scarlet fever and cholera. The epidemic wave of the disease is determined mainly by the temperature of the earth. No special microbe has yet been distinguished, but he has no doubt of the dependence of the disease on some chemical irritant produced by a microbe in certain loose soils: clay soils are not diarrhoeal. He asserts that epidemic summer diarrhoea does not begin until an earth thermometer, sunk 4 feet in the ground, registered 56° F. (13.3° C.). The disease very probably depends upon a special micro-organism which develops in loose soils at certain temperatures.

F. S. Sellen⁵⁹ _{Apr. 20} reports a case of croupous colitis occurring in a child suffering pharyngeal diphtheria. A croupous inflammation of the entire colon existed, and to the mucous membrane, from the anus to the cæcum, adhered a flocculent pseudo-membrane, gradually decreasing in quantity from below upward. The question arises whether this colitis was of diphtheritic origin.

Moore²⁶ _{Aug.} regards summer diarrhoea as a phase of cholera; the latter prevails in hot seasons in warm climates, while the former is most prevalent in the hot season of temperate climates. The

pathology of the two conditions is very similar, and the sequelæ are identical; indeed, the diagnosis is sometimes so uncertain that we are told by most competent authority that the prevalence of an epidemic must decide.

Treatment.—The treatment of catarrhal affections of the stomach and bowels, according to W. W. Van Valzah,⁵⁹ _{Dec. 8, '88} is largely one of diet, and that diet should be composed principally of animal food, beef being the main-stay. To prepare the stomach for food there is no simpler method than the sipping of hot water, from 110° to 120° F. (43.3° to 49° C.), an hour before meals, as it is a diluent, solvent, and stimulant, and also promotes downward peristalsis. In some cases milk warm from the cow is desirable, this to be drunk very slowly. Holsti²⁴ _{Mar. 17} recommends naphthalin in 7½-grain (.49 gramme) doses four times a day in fetid diarrhoea. Khristoff¹⁰⁹ _{Sept.} highly recommends in diarrhoea the use of 2 to 3 teaspoonfuls of ground burnt coffee impregnated with the juice and pulp of lemon, given two or three times daily.

Chronic Diarrhoea.—Hoffmann⁵⁶ _{June 16} reports great success in the treatment of chronic diarrhoea by the internal administration of silicate of magnesium in daily doses of 6 to 18 drachms (23 to 62 grammes), given in milk. Salicylate of bismuth is recommended by Mikhaïloff²⁵ _{Aug.} in 6-grain (.39 gramme) doses three times daily.

DYSENTERY.

H. L. Jenckes¹²¹ _{Mar.} quotes Ewart as stating that the mortality from dysentery in India has been reduced from 80 to 20 per 1000 by the use of ipecacuanha, given in from 20 grains to a drachm (1.3 to 4 grammes), dose every twelve hours. The use of alum-water enemata—½ ounce (16 grammes) of alum to ½ pint of water—is strongly recommended by Hepburn⁶ _{Aug. 31} in the treatment of dysentery. Creolin injections have been tried in epidemic dysentery by Ossovsky.⁵⁸⁶ _{No. 14} Half-per-cent. solutions were used twice or three times daily with good results.

CONSTIPATION.

Renaud²²⁰ _{June 14} reports a case of double hydronephrosis, in which he attributes the second hydronephrosis of the left side to compression of the ureter by the sigmoid flexure and rectum, which were enormously distended.

Treatment.—The method of treatment introduced by Anacker only about a year ago, namely, that of glycerin enemata, has received universal attention, and thus far only universal commendation. (See ANNUAL, vol. v, A, p. 78.) Griffith finds, upon research in this form of treatment, that it is not a new method, as supposed, but merely a revival of an old and almost forgotten custom. The view as to the mode of action of glycerin suggested by Anacker and accepted by many authorities, viz., that of its hygroscopic properties, producing a hyperæmia of the lower bowel and consequent increased peristaltic action, has been questioned by Reisinger, who found that concentrated solutions of sulphate of sodium introduced into the rectum had no such effect as glycerin, although both have the power of abstracting water. He, with Unger, Williams, and others, holds that glycerin excites the mucous glands to greater secretion. Administered in the form of suppositories it is equally efficient, and those prepared with soap by several reliable houses have given satisfaction. The only objection to enemata of glycerin offered by patients is the tingling sensation felt in the rectum after the injection, and this can be obviated, without interfering with its action, by adding an equal quantity of water to the glycerin.

Cleveland⁵⁹ suggests stretching of the sphincter ani as a method of cure in obstinate constipation. He has tried this treatment in 10 cases, with after-care as to diet, exercise, etc., with success. The theoretical grounds of explanations of its success are that faecal matter passing from the colon into the rectum aroused in the latter the conjoined muscular action by which its expulsion is to be secured. But in cases of long-standing constipation, the nerves of the rectum, distended by hard, dry faeces or blunted in sensibility, and the contractile power of its muscular fibres, are consequently much enfeebled, so that they are incompetent, even when aided by the expiratory muscles, to overcome the resistance of the sphincter ani, which thus acts as a barrier to the hardened masses. These latter, by overstimulating it to contract, prevent it from grasping the material packed close against it; so downward movement of the scybalæ is impossible. When, however, the muscular band has been forcibly stretched, it offers only passive resistance to the faeces, but still continues to check involuntary defecation, when not aided by the expulsive force of the respiratory muscles.

Hammond¹ has found electricity of great value in permanently overcoming constipation. He uses the galvanic current, the negative electrode being passed well within the sphincter; he has in this manner cured cases in five minutes after months of ineffectual catharsis.

Garry² considers massage, if carried out with due regard to the cause of constipation, as a specific in treatment. He thinks its mode of action as threefold, viz., mechanical, reflex, and thermal.

DUODENAL ULCER.

Three cases are reported by Mackenzie^{6 Dec. 1, '88}: Case 1. Seven years before, pain in the right side and intestinal haemorrhage. Pain for three weeks in right side; occasional vomiting; three days pain intense; sudden intense peritonitis, resulting fatally. Temperature normal. Autopsy: two ulcers in the duodenum near pylorus; small abscess outside lower ulcer; recent general peritonitis; contracted kidneys.

Case 2. Sudden pain; symptoms of intestinal obstruction; acute peritonitis; exploratory laparotomy; cause not discovered. Death. Autopsy: ulcer of duodenum; no perforation mentioned, but the inference is that there was one in this and in former case.

Case 3. Eight years before, intense pain in the epigastrium and vomiting; recovered in two months. This attack began with sudden pain and rapid development of peritonitis. Death. Autopsy: general peritonitis; two duodenal ulcers, one perforated.

Bradbury^{6 Dec. 15, '88} reports the case of a woman aged 20. Anæmia for one week; pain after food; vomiting and constipation; castor-oil taken. Perforation and speedy death. Autopsy: ulcer anterior surface duodenum, $\frac{1}{2}$ inch from pylorus. Woodward^{80 June 18} describes a case in a woman aged 52. In June, 1887, sudden attack of cholera morbus; afterward indigestion; one year later fever, tympanites, pain over left side, diarrhœa, nausea; blood from intestines soon followed, but soon ceased. Strength failed rapidly. Died in three months. Autopsy: adhesion of duodenum to liver; perforated ulcer of duodenum at point of adhesion near pylorus; calculi in gall-bladder; pancreatic calculi.

Sabrazès,^{188 June 20} reports the case of a woman who died from perforation of the duodenum; she had never had haemorrhages.

PRIMARY MALIGNANT DISEASE OF THE DUODENUM.

Whittier¹⁰¹⁸ gives the history of 13 cases of this disease in which autopsies were made. The symptoms were vomiting, sometimes coffee-ground matter, or blood diarrhoea or constipation; pain, prostration, emaciation, and jaundice. A tumor can be detected in a small number of cases.

INTESTINAL OBSTRUCTION.

Treves states that over 2000 persons die every year, in England, from various forms of intestinal obstruction, exclusive of hernias.

Clinical History.—A very peculiar and rare case of intestinal obstruction is reported.²⁷² At the autopsy, about 6 inches of the jejunum appeared black, as if gangrenous; but, upon closer inspection, a large clot of blood was found, extravasated between the peritoneal and muscular coats of the intestine, which completely occluded the lumen of the intestine at that point. Sottaz¹⁵² gives an interesting history of a case where obstruction occurred from a large calculus, of the shape and size of the gall-bladder, which was finally passed *per anum*. Yates² reports a case of intussusception in a child 2 years old, which simulated, and was diagnosed as, duodenal ulcer, having occurred during the third week of an extensive burn of the third degree. Brinton⁶ collected a series of 500 fatal cases from some form of intestinal obstruction, and of these no less than 215 were due to invagination. Nothnagel¹ found, by application of a ligature to the intestines of an animal, that if it is applied sufficiently tight to cause complete obstruction, violent peristalsis is caused above the seat of ligation, but that no antiperistalsis is produced. Faecal vomiting is accounted for by the fact that in the direction of the stomach least resistance is encountered.

A case of congenital occlusion is reported by Albertson¹¹² where the stomach ended in a *cul-de-sac*, having no connection whatever with the intestine; the bile-duct emptied into this sac, producing intense jaundice. The child lived seven days, and had a small movement from the bowels every day. Another congenital case is reported by Anderson,⁵⁹ where about an inch of the duodenum was absent, also ending in a *cul-de-sac*.

Alfred Obalinski,⁴ of Cracow, refers to secondary entangle-

ment of the gut by peritoneal lesions. He states that, thanks to antiseptic surgery and improved technique, septic infection, which for a long time passed under the name of shock and secondary haemorrhage, had been controlled, but lately another enemy had arisen, and this was the ensnaring of the gut during convalescence. To this condition he gives the name of secondary occlusion. He reports the case of a patient doing fairly well for two weeks after the operation, when colic suddenly developed, which resisted all treatment. Laparotomy was performed, and the cause of colic was observed to be a pseudo-ligament, encircling the gut in such a manner as to almost completely exclude it; the band was removed and the permeability of the gut restored. He states that it is important to decide whether obstructions have their origin from peritonitis or from adhesions produced by pseudo-formations. In the former case we find a paresis of the gut and tympanitis; in the latter we perceive very plain antiperistaltic movements in the gut. Spencer Wells had 11 cases of secondary adhesions out of 1000 laparotomies. The earlier the occlusion is diagnosed and operated upon, the better for the patient. Too long exposure of the gut is the probable cause of this condition.

Diagnosis.—Wahl, of Dorpat,³³⁶ refers to locating the seat of lesion without resorting to exploratory incision. In the beginning the meteorism is limited in *occlusion* of the lower end of the colon, and is confined only to the colon; if occlusion is in the lower part of the small intestine tympanitis is more marked in the middle of the abdomen. Further, that in certain cases of intestinal occlusion, either by strangulation or torsion, a certain portion of the gut becomes tympanitic or fixed, which can be diagnosed by inspection and the want of symmetry in the form of the abdomen and increased resistance manifested by palpation.

Treatment.—The treatment of abdominal surgical affections⁹ has of late outdistanced their diagnosis,—so much so, indeed, that exploratory incisions should be made to aid one in reaching a diagnosis. It seems to be generally conceded that such procedures are accompanied by less danger to the patient than uncertain delay.

The most rational treatment, according to Baldy,⁶⁰ is that by gentle and properly-applied enemata; but if, after a short but faithful trial with these no result is obtained, and there is a reasonable cer-

tainty that no faecal impaction exists, then the proper course is to open the abdomen without hesitation.

Richardson²² formulated a rule in the treatment of intestinal obstruction by urging operation without delay as soon as stercoraceous vomiting begins, as in this measure lies the only chance after this symptom supervenes, and he adds that symptoms of collapse are not a contra-indication to operative measures.

Goltdammer⁴ draws the following conclusions, based upon observation of 50 cases of ileus. He says that, setting aside cases in which ileus depends on hernia, preliminary laparotomy must be limited to (1) cases in which intussusception is recognized, the condition of which is most readily diagnosed by the youth of the patient, suddenness of onset, absence of meteorism, loose and bloody stools, tenesmus, with the presence of a tumor of characteristic shape. 2. Cases in which, after an acute onset, and in spite of energetic treatment with opium, severe symptoms of obstruction and collapse persist so as to give rise to the suspicion of acute internal strangulation. 3. The operation should be undertaken as a last resource in cases in which, after the subsidence of all symptoms under opium, severe symptoms set in anew.

Heard⁸² recently advised the use of electricity in intestinal obstruction, the method being to fill the colon with salt water and introduce one electrode into this, the other being placed on the abdominal muscles.

The treatment of intussusception by inflation⁶ has been successfully used when the diagnosis is made early, though, even when an intussusception has existed a week, the prospect of cure is not hopeless.

Otto Damsch, Göttingen,⁴ refers to the value of artificial inflations of gut by gases. He does not think Ziemssen's method practical; he prefers methods of introducing carbonic-acid gas suggested by Schuetter, of New York, who uses siphons filled with gas. He believes that air gives the same, if not better, results than gas, while a less quantity is necessary. He uses a rubber syringe, supplied with an air-cock to prevent regurgitation; 1 litre of air will expand the gut to the cæcum without having any effect upon peristalsis. After complete inflation of abdomen with air, he states that three different regions can be clearly detected: 1. To the left, stretching itself upward to a line drawn from one spinous process

of the os innominatum to the other. 2. A region above the navel as wide as the hand. The third region corresponds to the distribution of the small intestine, and gives a very high percussion sound. By sufficient inflation, air will readily pass the ileo-caecal valve. Before he had finished inflation with a litre (1 quart) of air percussion of the small intestine showed that it was already present there. In his experiments, as well as those of Ziemssen, the ileo-caecal valve was never overcome by inflation of CO_2 . He prefers air inflations to injections of masses of water.

Curschmann, of Leipzig,¹¹⁶ refers to the treatment of ileus. He classifies ileus as follows: 1. Volvulus. 2. Internal incarceration. 3. Occlusions by foreign bodies and tumors. 4. Compressive adhesions and paralysis of gut.

In every case of ileus we have two important points to consider, viz.: 1. How great the hindrance to the onward movement of intestinal contents is. 2. The power of the gut to overcome hindrance. The greater the tension in the gut, the less likelihood is there of its overcoming the incarceration. Statistics show out of 105 cases 37 recoveries (35½ per cent.). He considers the chances greater for the patient without than with operation interference. The chief point of danger in doubtful cases, in operating, lies in the reaction on nerve-centres, special innervation of the heart. In cases of heart failure, and when symptoms similar to cholera collapse develop, he has had good results from hypodermic injections of a solution of chloride of sodium. He warns decidedly against the use of purgatives, and is a thorough believer in the use of opium, in large doses. Next to opium, not only as a palliative but also as a curative agent, he highly recommends washing out of the stomach. The great benefit of this agent depends upon the insufficiency of the pylorus. During the washing new masses from the intestines come out with regurgitating fluid. This lessens tension in the gut. The palliative effect is noted in cessation of nausea, vomiting, and regurgitation of faeces. In cases where no relief is experienced by this method he resorts to puncture of the gut at different points, using for this purpose a hypodermic syringe. By employment of the latter method he claims 3 recoveries. If symptoms of peritonitis are present he never uses puncture. He has lost faith in forced injections, and speaks favorably of the use of air insufflations.

Köhl, of Graubünden, ²¹⁴_{July 15} takes exception to Curschmann's remarks as to the impossibility of oil injection passing beyond the ileo-cæcal valve, and of the uselessness of this remedy. He gives the history of a case in which he made use of this remedy with relief to the patient, although dying, as he states, from paralysis of the intestines. At the autopsy no volvulus could be found, but from the condition of the ileum 6 centimetres (2.4 inches) from the valve there was no doubt that one had here existed. The relief of this, he states, must have been due to the action of the oil.

Mahnert ³⁸³_{Mar. 16} believes in the use of enema by irrigation, with the possible addition of a small amount of purgative agents to the warm water used; he highly prizes air inflations, especially in cases of intussusception, and advises the use of Lund's inflator, which, by a peculiar construction, prevents the escape of air. He considers CO₂ of more value than air, not only because a diagnosis can be more readily made thereby, but also because it increases peristalsis, while it aids in restoring the intussusception. He uses the siphon, and says that under its influence the gas can readily pass the ileo-cæcal valve. It is dangerous to resort to massage in acute cases, he thinks, but it may be of value in chronic cases and in gall-stones. Some cases of ileus have been cured by electricity, but Mahnert considers it only of value in intestinal paresis. Metallic mercury is dangerous, and he very strongly condemns its use. Purgatives he also condemns, but recommends opium. He reports a case in which only rinsing the stomach effected a cure after failure of other methods. In another case a passage was obtained in six hours, after washing out the stomach, in an ileus of nine hours' duration. He reports several cases of his own cured by this method.

Mahnert ³⁸³_{May 7} believes that the effect of rinsing out the stomach is twofold: 1. It is curative; 2. It is palliative. A typical curative action is produced when the passage is restored. Sometimes the effect is not complete, as the gut is not restored to its original condition. The curative action is not always absolute, as one cannot be certain in which cases it will be effective; it is only relative. Its curative action is not limited to certain forms of occlusion. Incarceration, as well as volvulus, can be benefited. Curative action is more certain in the incomplete than in complete occlusion of gut.

In every case, after rinsing of stomach, a palliative effect is

shown, and as an euthanæsial measure it is of value in cases when operation is inadvisable. Always, after rinsing stomach, improvement is shown in amelioration of the intensity of the symptoms. It aids in removing putrid matter from the stomach.

Nothnagel's⁶⁵⁰_{No. 12, 13} experience for many years in the treatment of ileus causes him to adopt the following plan: Increase peristalsis by enema; fight collapse with opium; order complete abstinence from food; give no purgatives. He uses lavage of the stomach, first recommended by Küssmaul, and, although he observes no visible results, he considers it is a palliative of value. He does not advise massage or electricity, but says no harm can result from the use of metallic mercury in fresh cases. Fitz⁶¹_{Aug. 17} states that the diagnosis must be made in the first two days, the capacity of the colon being ascertained before tympany develops.

Diagnosis should be made by exclusion, seat by injection, variety by seat, age, and antecedents. Treatment should be surgical on the third day.

PERITONITIS.

Etiology.—The experiments of Rinne²²⁶_{v. 39, p. 1} go to show that the peritoneum is capable of absorbing large quantities of septic material without serious results so long as the membrane is uninjured; but when from any cause the subperitoneal connective tissue is exposed to infection, suppurative peritonitis, with fatal results, follows.

Experiments by Pawlowski⁵⁷_{Mac. 11} have shown that (1) the injections of chemical substances (croton-oil and trypsin and cold filtrates of pathogenic microbes) produce a septic hæmorrhagic peritonitis; (2) non-pathogenic microbes do not produce peritonitis; (3) a small number of pathogenic microbes produce peritonitis, as *staphylococcus aureus*; (4) unfiltered digestive secretions produce peritonitis, while the filtered and sterilized secretions have no effect. McCaskey⁶¹_{Feb. 16} says there is no such thing as idiopathic peritonitis; cold and traumatism alone may be suspected as efficient causes.

For all practical purposes peritonitis may be considered as caused by micro-organisms, rendered operative by favorable local disturbances. In most cases it is consecutive to infectious disease of some other tissue or organ, contiguous or remote.

According to Fenwick,⁶_{Mac. 22} we have three conditions which seem to be the chief causes of *chronic* non-tubercular peritonitis,

viz., cirrhosis of the liver, chronic diseases of the kidney, and pelvic abscesses; if you can exclude these, you will be justified in looking upon any well-marked case of chronic peritonitis as of tubercular origin.

A case of peritonitis from perforation of the gall-bladder, the ulcer being due to a small gall-stone, is reported by Mackenzie.⁶ The symptoms were pain above umbilicus, vomiting, and acute peritonitis, which proved fatal.

Symptomatology.—The onset of acute secondary peritonitis, according to Mackenzie,⁶ is characterized by a sudden attack of severe pain, generally soon followed by vomiting; later on the characteristic signs of peritonitis manifest themselves, viz., anxious expression, dorsal decubitus, thoracic breathing, rigidity of the abdominal walls, usually constipation, sometimes retention of the urine, generally persistent vomiting, pulse always rapid, though the temperature is seldom high.

Diagnosis.—Tyson⁹ says that rheumatism of the abdominal muscles sometimes simulates peritonitis so closely as to be totally misleading. He has seen the symptoms yield with magical promptness to salicylate of sodium. Packard⁵⁹ cites the case of a boy taken with severe abdominal pain, with frequent vomiting, elevated temperature, rapid pulse, hardness and tenderness of the abdomen, when suddenly the pain in the abdomen disappeared and the vomiting ceased; he immediately complained of intense pain in the knee-joint, which presented all the signs of rheumatic inflammation.

Several cases are reported in which rheumatic peritonitis, so called, attacked the peritoneum subsequently to rheumatic implication elsewhere. To determine the presence of pus is sometimes a difficult task. When typhoid symptoms supervene, with delirium and irregular chills, the diagnosis is easy, but these do not always occur. Aspiration may be used to aid diagnosis if the effusion is considerable. Fever may be entirely absent in suppurative peritonitis. In a fatal case seen by me, due to perforating appendicitis, there was no fever, although the patient lived six days.

Treatment.—It is, of course, impossible to lay down any absolute rules for the treatment of peritonitis, as each and every case must be a study in itself. Baldy⁸² says: "First determine the

cause, if possible, and if it is found to be an organic one the immediate use of the knife, followed by irrigation and drainage, is the only proper procedure. If it is of a doubtful character, first try purgatives, and be prepared for surgical interference at the shortest notice." He urges the use of salines in preference to opium for the reasons that the peritoneal cavity is thus drained of products of inflammation; the increased peristaltic action of the bowels prevents, also, the formation of bands and adhesions, and, as a clinical fact, relieves the pain as quickly as opium. Bantock and others have no faith in salines. In perforative peritonitis they are worse than useless, and in peritonitis by extension of inflammation with threatening perforation, as in typhoid fever, it is also inadmissible.

Tait and others say that the opium treatment has its place only when you have given up all hope of curing the patient and want to make him comfortable. As to the two methods of treatment,—by salines and opium,—the conclusion seems to be as follows¹¹²: that in acute peritonitis, which is recognized almost at the moment of its birth, the use of salines, by their rapid and complete depletion, may abort an attack; whereas, in the case which is not seen by the physician until hours have elapsed, and in which grave doubts may exist as to the cause, opium and external methods of depletion must be used.

An abdomen containing pus, either encysted or free, produced by puerperal disease or any other, demands opening and removal of that pus; because, if there is not active peritonitis present, the patient is liable at any moment to be so attacked. Baldy⁸² states that this fact does not seem to be sufficiently understood, and physicians are constantly treating pelvic abscesses with local applications, electricity, etc.

In a case of suppurative peritonitis in a girl, 5 years of age, who had had diphtheria, a spontaneous opening occurred, with the escape of fetid matter. Through this opening the abdominal cavity was repeatedly irrigated by Engström⁶ until the fetid discharge ceased.

Nineteen cases of acute peritonitis are reported by Musser,¹¹² which recovered under medical treatment without operation; 11 were due to appendix disease, 7 to pelvic disease, and 1 to inflammation of the biliary passages. The treatment was as follows:

1. Local blood-letting—3 to 15 leeches; in more advanced cases, a blister, this followed by hot fomentation. 2. Liquid diet; stimulants when necessary; also cracked ice, lime-water, champagne. 3. Calomel in small doses hourly until bowels are moved, continued to ptyalism, with opium; an enema of warm sweet-oil and warm water if calomel does not act. 4. Aconite for children, veratrum viride for adults, until pulse-rate is reduced. 5. Morphia and atropia, hypodermically, to relieve pain. 6. Stimulation by subcutaneous injections of whisky, digitalis, atropia, and nitrate of amyl in collapse. Cases requiring operation are: 1. Fulminating forms: rapid advance of symptoms, excessive tympany, vomiting, feeble pulse, great restlessness. 2. Imminent collapse in spite of treatment: vomiting, rapid pulse, growing feebler, and lowering temperature. 3. Pus in the abdominal cavity or in a tumor in or adjacent to the abdomen. 4. Grave cases: peritonitis from perforated appendix, inflammation of the biliary passage or the tubes, ulcer of the stomach or intestines. 5. Intestinal obstruction, intussusception, etc.

The clinical features of *acute tubercular peritonitis* are said by Fenwick⁶ to consist of more or less acute pain in the abdomen, increased by pressure, with an irregularly-elevated temperature, rapidity of pulse, rapid loss of flesh and strength, thirst, loss of appetite, and continuous diarrhoea, or diarrhoea alternating with constipation.

Hight²¹³ reports a case of tubercular peritonitis, verified by autopsy ten years later, which was cured by constitutional treatment. Ten cases of healed tubercular peritonitis are reported by Coats.²¹³ The possibility of a retrograde process in marked tubercular disease in the peritoneum is proved by the autopsies in these cases. Universal adhesions and cretaceous masses were found. One patient died from tubercular disease elsewhere, the other from obstruction of the intestines by entanglement in a peritoneal band. Tison⁷ reports a case of acute tubercular peritonitis.

ASCITES.

The treatment of ascites by faradization, as recommended by Muret, especially where due to portal obstruction in affections of the liver, spleen, and peritoneum, and in pericarditis, has proven very useful in the practice of Kauffmann.¹⁵ One can readily, with

a moderate current, produce energetic contractions of the abdominal muscles: they are in turn faradized, the electrodes, provided with an interrupter, being placed on the motor points of the muscles. As soon as a moderate contraction is produced the current is interrupted and the muscles allowed to relax. This is repeated several times, the sitting lasting from ten to fifteen minutes once or twice daily. Its effect is much increased when the treatment is begun by tapping.

In the above method of Muret's, Erb⁶⁴⁵ would rather attribute the accelerated absorption and diuresis to the action of the current on the nervous plexuses, by which means the absorbent vessels are brought into action, thus enabling the fluid to be carried off by the kidneys, than to the muscular-contraction theory, as advanced by Muret and others.

Schwass⁹ _{June 29} recommends, in cases of ascites following cirrhosis of the liver, the following formula:—

R. Calomel, gr. ij (0.13 grammie).
Digitalis, gr. iij-iv (0.2-0.26 grammie).
M. Sig.: Every three hours for a week

He says the diuretic action of this combination is far greater than either drug singly, and can be tolerated longer and better than either drug alone.

A case of continual drainage is reported by Hicks,¹³⁷ _{Oct.} where tapping had frequently been performed. A small silver tube was inserted and secured after paracentesis, and a small stopper placed in the end of the tube; about once daily, the stopper being removed, a long tube was inserted and the abdominal cavity drained. The tube was allowed to remain six months, when, fluid ceasing to accumulate, it was removed. This case illustrates the tolerance of a foreign body in the peritoneum as well as a very successful plan of treatment.

Chardhoory⁶ _{Dec. 29} says he has had most excellent results in the treatment of ascites and anasarca by an exclusive milk diet and iron, combined with certain drugs to increase the absorbing power of the emunctories of the body. The *rationale* is based on the principal of endosmosis and exosmosis. This diet with iron very soon enriches and thickens the blood, and this causes a greater absorption of the fluids in the peritoneum and cellular tissue.

To help the kidneys excrete, he prescribes digitalis, squill and

juniper powders, warm clothing and hot baths to assist the sweat-glands, and an occasional purge for the intestines. Under this treatment he has seen most hopeless cases of dropsy rapidly improve.

Duhamel¹⁶⁸ reports a well authenticated case of a man with enlarged liver (due to excessive spirit drinking) and consequent ascites and oedema. He had been tapped many times, but the peritoneal cavity quickly refilled. On the occasion of his fifty-third tapping he asked to be allowed to drink of the fluid withdrawn, and drank about 8 ounces with apparent relish. The dropsy did not recur, even after several months, though the liver was still perceptibly enlarged.

CHOLERA.

Etiology.—On account of the active movement possessed by comma bacilli, Neuhaus⁵⁰ _{Jan. 12} concludes that they, like other bacilli, must have a vibratory process. In his investigations, using high powers, bringing micro-photography to his aid, and staining with various fluids, he obtained only negative results. With Kaiser ink-staining, small processes were seen, but not in sufficient numbers as to be thoroughly convincing. Kitasato⁵⁸ refers to the action of cholera bacilli in milk, and quotes a case reported by Simpson (Calcutta) in which 18 sailors of a ship were infected by milk obtained from a milkman in whose neighborhood there had been cases of cholera. In non-sterilized milk he shows that cultures at a temperature of 36° C. (96.8° F.) increase very rapidly during the first four hours, but after that time decrease with the increasing acidity of the milk. The milk becomes sour sooner with increase of temperature, and the bacilli were destroyed by sour milk. In sterilized milk the experiment shows that the cultures were, in the beginning, amphotiles, and at 36° C. (96.8° F.) the milk gradually turned sour, the bacilli disappearing; within two weeks the cultures were completely free from bacilli. In his *résumé* he states that sterilizing milk by cooking is the most simple way to destroy the bacilli.

Kartulis⁵⁸ _{Apr.} refers to the importance of examining the dejecta of patients suffering from diseases simulating cholera. In examining the dejecta of 11 patients having cholera morbus, he failed in any to find the comma bacillus. He refers to Finkler and Prior's supposed observation of comma bacilli in these cases, and

the importance of deciding whether cholera morbus is a disease *sui generis* produced by the same bacillus, or due to ptomaine poison.

Löwenthal, ⁶⁹ _{June 20, 27} in his experimental researches, commenced in Berlin and further pursued in Paris, shows that, besides the inherent virulence of the comma bacillus, there is developed a poison by its presence and the presence of other agents; this he designates the toxigenic ability of the comma bacillus.

By his research he shows that the pancreatic juice is essential to the development of this condition. The bacilli only develop in the intestinal canal, an alkaline fluid being essential. The acidity of the stomach is sufficient to destroy the activity of the bacillus. In knowing that the pancreatic juice is the proper soil for development of bacilli, we have only to find some means to destroy or prevent this activity in order to obtain a specific. He recommends salol for this purpose.

Hueppe ⁶⁹ _{Aug. 15} attacks the experiments and deductions made by Löwenthal, who, he says, did not prepare properly the food with which he fed animals, and that by cooking the food to a temperature of 100 degrees he sterilized the pancreatic juice. The principal element in fresh pancreatic juice is pancreasenzyme, which Löwenthal completely destroyed by cooking. Enzyme is essential to make a successful cholera culture. He claims priority for Stahle and himself in the recommendation of salol.

At the present time the general medical opinion as to the relationship of the comma bacillus to Asiatic cholera may be thus stated: The organism is found as a constant concomitant of the collapse stage of Asiatic cholera; it has never been found apart from the disease; it appears in that part of the body especially affected, viz., the intestinal canal, and disappears with the disease. While it may be regarded as pathognomonic, it has yet, according to Mac-Leod and Milles, ⁶ _{Mar. 2} to be proven to be the cause of the disease.

Hehir, ²⁰⁶ _{May} in a special report of cholera occurring under his observation, noted the following statistics: He found the proportion of males to females affected as two to one, occurring most frequently between the ages of 26 to 50 years, among the working class and in the densest localities and those with the greatest sanitary defects. He also noted that diarrhoea and malarial fever prevailed extensively at the same time.

With regard to the epidemics of cholera in Persia, J. E. Pollok⁸ found that after each invasion the germs died out, and with each recurrence there was a new importation of germs. The point of entrance of the epidemic into Persia has completely changed. It formerly was from India *via* Afghanistan—from east to west. At the present time it comes from Mesopotamia—from west to east. The spread of cholera in the Orient he charges largely to the Pilgrims. Cholera occurs in epidemic form from June to end of October. The present epidemic of cholera appeared in August, 1889, coming south from Besora and extending onward toward Rescht, on the Caspian Sea. He concluded by stating that, should cholera re-appear in the summer of 1890, the course not being disturbed by hygienic measures, middle Europe need have no fears of invasion before 1891.

The dark color of the blood in cholera is not, says Sedgwick,²⁵ due to defective oxygenation, as has been supposed, for, as a matter of fact, as proven by chemical analysis, there is an excess of absorption of oxygen over that of carbonic-acid gas.

Montefusco⁵³⁷ _{v.10, No.4} states that jaundice in cholera is not from the suppression of the secretion of bile, but from some impediment to its excretion.

Treatment.—From a known analogy existing between the physiological action of muscarin (alkaloid of the poisonous mushroom) and the poison of cholera, the antidote to muscarin—*atropin*—has been advocated and used in the treatment of cholera. It is combined with opium, which is used to check excessive secretion, and has been injected over the epigastrium by Ross.⁶¹⁷ _{June}

The hypodermic injection of liquid extract of ergot is recommended by Comerford²⁵ _{Oct} in the first stage of cholera.

Duboué,¹⁰⁸⁶ after a careful study of cholera, concludes that all agents which prevent the division of epithelial cells (as nitrate of silver, sulphate of copper, tannin, etc.) may be of benefit in the prophylactic treatment. To restore the circulation in the collapse stage he suggests three methods: 1. Intra-venous injections. 2. Tracheocentesis. 3. Immersing the patient in warm water for two or three minutes.

Löwenthal⁴²⁶ _{v.10, No.4; July 27} is convinced that he has found in salol the specific antiparasitic for cholera. He regards it as perfectly harmless, and therefore to be given in large doses. He is still pursuing his investigations in this direction.

He took a 50-gramme alkaline solution of pancreatic juice, and to this added 10 grammes ($2\frac{1}{2}$ drachms) of salol; to this solution was added 3 cubic centimetres (49 minims) of a good bouillon culture. Examinations made from forty-eight hours to a week invariably proved the solution sterile. Salol in bouillon culture, without pancreatic juice, had no influence whatever. These experiments show that salol must be incompatible with development of this poison. The author, by taking several large doses of salol (10 grammes— $2\frac{1}{2}$ drachms—in 2 doses), without unpleasant symptoms, shows that the human system can well tolerate the drug. Experimental research made upon cultures and upon mice seem to prove the efficiency of the drug. In a foot-note he acknowledges that he is not the first to have recommended it, but that he is the first to have recommended it after making scientific investigation and on scientific reasoning.

K. Dehio ²⁰⁹_{Feb. 26} gives the following as a precise prescription for Inosemzeff's anticholera tincture:—

R	Tr. rhei comp.,	.	.	.	ℳv	(0.31 cubic centimetre).
	Tr. rhei spirituosæ,	.	.	.	ℳij	(0.12 cubic centimetre).
	Tr. opii simpl.,					
	Tr. valerian. æth.,					
	Tr. menth. ppt.,					
	Spts. aetheris comp.,	.	aa	ℳij	(62 2 grammes).	
	Ol. menth. ppt.,	.	.	.	ℳxxiv	(1.5 cubic centimetres).
	Ext. nucis vom. spts.,	.	.	.	gr. ivss	(0.29 gramme).

DISEASES OF THE DIGESTIVE ORGANS IN CHILDREN.

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DISEASES OF THE MOUTH.

THERE are very few other subjects in medicine in which more confusion exists in classification and nomenclature. No better classification has been proposed than that employed by Forchheimer ⁵¹ Sept. '51 to Sept. '52: 1. Stomatitis catarrhalis. 2. Stomatitis aphthosa. 3. Stomatitis ulcerosa. 4. Stomatitis mycosa. 5. Stomatitis gangrenosa. 6. Stomatitis crouposa, stomatitis diphtheritica. 7. Stomatitis syphilitica.

Stomatitis Catarrhalis.—Catarrhal or simple stomatitis is usually caused by an irritant, either mechanical, chemical, or thermal, and is especially prevalent in children of the so-called scrofulous tendency. It is also seen in the exanthemata and prolonged fevers. The disease may involve the whole surface of the tongue, lips, and cheeks, and appears under two forms: 1. Erythematous, a superficial process marked by heat, pain, redness, and dryness of the mucous membrane. 2. True catarrhal, a condition of actual inflammation, marked by thickening and softening of the mucous membrane, with heat, pain, redness, and hypersecretion. The pain is at times so great as to prevent nursing; the saliva is increased in quantity, and is often acrid, excoriating the lips and chin. Fever is not uncommon.

The disease, as a rule, runs a favorable course without treatment. All harsh measures and irritating applications should be avoided. Perfect cleanliness of mouth and nipples is of the utmost importance. The mouth should be cleansed after each feeding by cotton wrapped upon a small rod, or by inducing the child to suck ice-water from a piece of soft linen. Food, as far as possible, should be given cold, but the child should not be taken from the breast. Chlorate of potash is useless and often harmful. Even borax or boric acid is not, as a rule, necessary. If the disease persist, the

mouth should be penciled with a $\frac{1}{2}$ -per-cent. solution of nitrate of silver daily, and cracks or ulcerations should be touched with the mitigated stick.

Stomatitis Aphthosa (Follicular Stomatitis, Vesicular Stomatitis).—By aphthæ are meant spots of varying color, appearing within the mouth, situated under the epithelium, and surrounded by an areola. Their origin is uncertain. They have been considered by some authorities as vesicles modified by location, and by others as follicular in character. Against the latter view is the fact that they appear where no follicles are found. The cause of the disease is very obscure. That it is contagious is doubtful, though cases occur which seem to indicate such an origin. No special bacterium has been found, neither has a nervous origin been proved. It is especially associated with pneumonia, ague, gastro-intestinal catarrh, and the exanthemata.

The only constant symptoms are local, the most urgent of which are pain, which is often so acute as to prevent nursing or eating, and an increased flow of saliva, which is never fetid. The eruption consists of small, yellowish-white spots, appearing, singly or in groups, in any part of the mouth, leaving a shallow ulcer with red margins, and healing perfectly with no cicatrix. The onset is sudden, twenty-four hours being sufficient time for the development of fully-formed ulcers.

Aphthous stomatitis of children should not be confounded with the chronic catarrhal ulcers of adults, which run a prolonged course, with little tendency to heal.

Each ulceration may be touched with nitrate of silver, but no other active measures should be employed. Chlorate of potash is useless, and cocaine is of no avail unless used in quantity that is unsafe. The disease tends to spontaneous recovery in from seven to fourteen days. Hertz,^{17 June 16; Oct. 673} speaks highly of a solution of salicylate of soda (5 drachms to 3 ounces—19.44 to 93.31 grammes), to be used as a wash after each meal.

Stomatitis Mycosa (Thrush, Soor, Sprue, Muguet, Mundschwämmchen, Parasitic Stomatitis).—Thrush is a parasitic disease due not to the oïdium albicans, but to another fungus, named by Reess *saccharomyces albicans*. Though its nature is not certainly known, it has been established that the process is not one of milk fermentation, but one that causes splitting up of the hydrocarbons

into alcohol and carbonic acid. The parasite is made up of mycelium, consisting of threads developing in segments, and spores resembling yeast-cells. It grows in an alkaline or acid medium, but much more readily when the reaction is alkaline or neutral. Its growth depends largely upon the soil upon which it is planted; hence, catarrhal stomatitis is a frequent forerunner of thrush. It is, in fact, the only constant etiological factor as far as we now know, and probably acts as such by destruction of the superficial epithelium. The spores are conveyed through the air or by unclean nipples, and are frequently found in healthy mouths, but gain no foot-hold; yet, given a membrane denuded of epithelium or injured by rough nipples, and the seed at once takes root. The spores are the first to develop, separating the layers of epithelium and lodging between the cells. The mycelium grows both upward and downward, developing best in the vicinity of the subepithelial connective tissue. The epithelial cells are raised and embodied in the mass of fungus, but no pus is formed.

The disease usually appears first upon the tongue, from which it spreads in all directions, involving even the tonsils, pharynx, and œsophagus. Whether it induces gastro-intestinal disorder is still a disputed question. It is often unaccompanied by gastric disturbance. It is possible that the saccharomyces alone may cause such disturbance, but it is probably more often due to the swallowing of the chemical products of the fungus. Erythema of the buttocks, so commonly seen in connection with the disease, is due not to the direct action of the fungus, but to the chemically-altered stools, which irritate the skin over which they pass.

The lesion appears as small, grayish-white spots, surrounded by a zone of blood-vessels. These soon become elevated, increase in size, often coalescing to form a membrane, having, in some instances, the characteristic filmy or lace-like look, in others that of a thick, white, friable membrane.

Prophylaxis consists in scrupulous cleanliness of the infant's mouth, as well as of the nipples, bottles, and feeding-implements. Treatment consists simply in complete removal of the fungus. This should be done gently, but thoroughly, four or five times a day. Of the numerous agents employed for this purpose nearly all have been followed by good results, which proves that they are of minor importance. Complete mechanical removal is absolutely

necessary. This is aided by an alkali, and bicarbonate of soda (1 teaspoonful to a cup of water) is one of the most efficient. It probably has no specific action upon the fungus, but acts through its solvent powers upon the mucus and elements of the membrane. The orthodox borax and honey, or any mixture containing syrup, only adds fuel to the fire.

Calomel in small doses, or corrosive sublimate well diluted, acts almost as a specific in intestinal disorders due to thrush, while the use of cathartics, alkalies, or other laxatives more often do harm than good.

Ord.⁶_{on.19} commends a wash consisting of equal parts of *lotio nigra* and glycerin, to be applied to the white patches with a brush. The same application rapidly removes the deposits and sordes of teeth and tongue of continued fevers. Fourcier¹⁹_{June 8} employs a 2-per-cent. solution of saccharin in alcohol. Of this a teaspoonful is added to a half-glass of water, with which the mouth is painted five times a day. Of 10 cases thus treated, 8 were cured in from twenty-four to thirty-six hours, 2 lasted three days.

Stomatitis Ulcerosa (Fetid, Putrid, or Phlegmonous Stomatitis, Stomatite, Stomacace, Mundfäule).—The literature of this disease is limited. The clinical picture is, however, a familiar one. The causation of this disease is as yet unknown, though many theories have been given. It is probably both systemic and local; whether bacteria are concerned in its production is uncertain, but it is positive that some other factor besides bad hygienic conditions are concerned in its production. The lesion begins with swelling, injection, and loosening of the mucous membrane about the teeth; a deep ulcer is soon developed, having a thick, red areola surrounded by a zone of œdema. The saliva is profuse and bloody, and the breath fetid. The lymphatic glands under the maxilla are enlarged, the teeth are sometimes loosened, and there may be necrosis of the jaw. It differs from aphthous stomatitis in consisting of a single ulcer, which usually develops about the lower incisors, secretes pus, and is accompanied by a profuse flow of saliva and a fetid odor.

Chlorate of potash is almost a specific. It is best administered in a 3-per-cent. solution with a little syrup, $\frac{1}{2}$ to 1 teaspoonful being given every two hours. Its toxic effects, if used in too large quantities, should not be forgotten. It usually produces consider-

able pain, but soon this ceases, and is a positive index of the curative effect of the drug. In obstinate cases the application of a solution of nitrate of silver may hasten recovery.

Stomatitis Gangrenosa (Noma, Cancerum Oris, Gangrene of the Mouth).—By gangrenous stomatitis is meant a gangrenous process which begins on the gums or inner side of the cheek and spreads with great rapidity. The predisposing cause is believed to be a special form of lowered vitality. It does not occur in vigorous, healthy children. It is not as yet known whether the direct cause originates within the system as a poison of some sort or from without as a microbe. Certain facts speak in favor of the infectious nature of the disease, but it certainly appears in some cases spontaneously.

Constitutional symptoms are marked, consisting of high fever and diarrhoea of the most intractable variety. Local symptoms are those of true phlegmonous gangrene. The disease is usually fatal in from one to two weeks.

General treatment is of no avail. The local treatment consists in removal of the gangrenous tissue under an anaesthetic. For this purpose hydrochloric acid may be used, but the galvano-caustic wire or the Paquelin cautery is preferable.

Stomatitis Crouposa and Stomatitis Diphtheritica.—Forchheimer believes that the croupous and diphtheritic processes are in their nature two essentially different entities. Croupous stomatitis is always a complication of croupous angina, the membrane developing simultaneously with that of the tonsils. Diphtheritic stomatitis is rarely primary, but a complication of diphtheria of the fauces. The treatment in either case is that suitable for the primary disease.

Stomatitis Syphilitica.—Strictly speaking, there is no syphilitic stomatitis, for syphilis, *per se*, does not produce stomatitis except in an indirect way. The term is too extensively employed, however, to be changed.

Syphilis manifests itself upon the lips as fissures, papules, plaques, and erosions. Fissures are the most characteristic. They appear at the angles of the mouth and on the upper lip, and are formed by the splitting of a mass of round-celled infiltration. Upon the tongue the same lesions occur, but plaques and ulcerations are most commonly found.

Cleanliness is the most potent prophylactic as well as curative measure. The mouth should be frequently cleansed with a weak solution of salicylate of soda. The sovereign remedy for all local lesions is nitrate of silver. Strong solutions of corrosive sublimate (as high as 12 per cent.) may be carefully applied to excoriations that resist nitrate of silver. The best mouth-wash in syphilitic cases is a solution of chlorate of potash. When an astringent is required tannic acid fulfills the indications.

DENTITION.

The diversity of opinion upon the importance of teething as an etiological factor in the production of various diseases is as marked as in former years. The drift of opinion seems to be strongly toward the belief that dentition is a physiological process, subject, in a comparatively small number of cases, to pathological conditions. Many lives are lost through the idea, so deeply rooted in the minds of the laity, that certain disorders are necessary accompaniments of the teething period, and that medical aid is not required.

Forchheimer,⁵¹ in one of the most complete and scientific papers that appeared upon the subject during the year, gives a highly instructive historical review, tracing back for 2000 years superstitions prevalent at the present day. Lancing of the gums, first performed by Ambrose Paré, reached its height in the time of Hunter, who performed the operation for eczema of the scalp and for a purulent discharge from the urethra resembling gonorrhœa.

Period of Dentition.—Study of the evolution of the teeth shows that the greater part of the process is accomplished before birth. The force that causes them to rise through the gums is the calcification of the fangs, the tooth, already formed, being forced in the direction of least resistance. If the beginning of dentition is placed at the time when pressure—the commonly-accepted cause of symptoms—begins, it is at birth. Symptoms are so varied and uncertain that it is impossible to state any time to be determined by them.

Order of Dentition.—In tables compiled from the writings of nineteen different authors, it is found that no two exactly agree as to the order of dentition and the eruption of different groups.

Nationality, climate, environment, and heredity all have their influence upon the time of eruption. French children teeth early; English, German, and Italian children one or two months later, on an average, and Hungarian children still later. In the United States, with its mixed nationalities, the statistics will depend largely upon the material taken for the calculation. As to the order of eruption, it may be in one of three ways, but accurate observations have not as yet been made in a sufficiently large number of cases to warrant a statement as to which is most common. Upon a few points all authors agree: first, that the two lower central incisors appear first; second, that these are followed by the upper incisors; third, that the first molars appear before the canines.

As to the rule laid down by Jacobi, that in premature ossification of the fontanelles and sutures the upper incisors appear first, the author's observations lead him to believe that this does not occur with sufficient frequency to establish a law.

Premature Teeth.—We can never be sure that a premature tooth will be replaced until the permanent teeth appear. Children with such teeth are usually puny, frequently syphilitic, and prone to haemorrhage upon the slightest injury. It is therefore best to allow such teeth to remain, unless some special indication exists for their extraction.

Delayed Dentition.—Rickets is a common cause of late dentition, but not every child that gets its teeth late has rickets, while rickets in many instances has no effect upon the progress of dentition. Any disease producing disturbance of nutrition, as long-continued fever or diarrhoea, may delay the appearance of the teeth, and heredity is a very potent factor. Deficiency of calcareous matter in the food is probably not a cause. When the food-supply is so bad as to affect the teeth by a deficiency of the small quantity of lime needed, the child will not survive.

Relation of Dentition to Diseases of the Digestive Organs.—Adams⁵¹ believes the evolution of the teeth to be a purely physiological process, subject sometimes to perversions. In a series of careful observations on 288 patients, he found that 70.9 per cent. of those without teeth were fed wholly or in part upon table food. With such evidence, the question at once arises whether it is not more scientific to attribute digestive disturbance to a known factor—improper food—than to a hypothetical one—a tooth still

confined to its sac. Of the remaining cases, the bottle-fed children received improperly-prepared food in most instances. In those exclusively nursed, the cause of illness could be traced to illness or indiscretion in diet on the part of the mother rather than to the teeth of the infant. The author fully believes that improper feeding, not teething, is the potent factor in causing disease of the alimentary tract in infants.

Treatment and Hygiene.—Crow¹¹⁷ disapproves of lancing the gums, as a rule, but believes that in certain instances it is productive of good results.

Monti⁸² _{Sept. 14} disapproves of all interference, and would prohibit the use of rings and the application of emollients. He keeps the mouth perfectly clean by the use of clear water, or weak solutions of boracic acid or salicylate of soda.

Stryker⁷⁶⁰ _{June 8} considers dentition one of the causes of convulsions and diarrhoea, and advises free incision of the gums. He maintains that scar-tissue rapidly disintegrates, and does not obstruct the eruption of the teeth, as usually taught.

DISEASES OF THE STOMACH.

Stomach Digestion.—Leo⁴ _{Dec. 3, '88; Feb.}⁸⁰ investigated 134 cases in infants by sounding or washing out the stomach. The sound used had an internal diameter of 5 millimetres ($\frac{1}{5}$ inch). When a stomach contained anything it was usually spontaneously emptied. At other times the fluid contained in the lower part of the tube was examined, always undiluted, because small quantities of matters might escape observation if diluted, and an acid reaction be changed to a neutral one. Thirty-five healthy children were examined, 12 being newly born. The reaction after human milk was always neutral or faintly alkaline; after cows' milk, slightly acid or alkaline; free hydrochloric acid could be found in the full stomach only after the lapse of an hour; sometimes lactic acid was found, but never fatty acids. In the fasting stomach hydrochloric acid could almost always be found. Propeptone was almost always found in the fasting as well as in the full stomach. The curdling ferment was always present. Once, when this was doubtful, its enzyme was present. It was always found when hydrochloric acid was present, and sometimes in large amounts. In nursing infants the stomach contents were frequently streaked with rusty, altered-blood coloring

matter, the source of which was believed to be some slight gastritis, and not blood swallowed during birth. This was not seen at a later age.

How long milk remained in the stomach was not ascertained, but a considerable quantity had passed into the intestine at the end of half an hour. The stomach of breast-fed children during the first week was found empty at the end of half an hour, while in older ones a considerable quantity of food remained at that time. The milk extracted after a certain time was examined for pro-peptone and peptone, and compared with a sample of the milk given. After resting in the stomach for half an hour, a considerable increase was found in both propeptones. Peptone was only present half an hour later. Peptonization and the secretion of acid consequently took place in the stomach. The child's stomach served chiefly, however, as a reservoir for milk, as the whole might be peptonized in the intestine. The coagulation of the milk might be supposed to be a preliminary step essential to its digestion, but experiments with trypsin on coagulated and non-coagulated milk gave no particular difference.

A part of the micro-organisms entering the stomach certainly are hindered in their development by the acid. Whether the stomach acts as a bulwark against the entrance of microbes into the intestine, future work must show. Fifteen minutes after food, reaction is always definitely acid. Free acid is not present till the end of digestion, but always in the fasting state. The proportion of acid is considerably less than in the adult stomach.

Stomach-Washing.—Leo ⁴ _{Dec. 3, '88; Feb. 80} has studied pathological conditions in 104 cases, 60 of acute dyspepsia, with or without vomiting, sometimes with fever and sometimes with diarrhoea; 22 of cholera infantum, 16 of gastric catarrh, and 6 of habitual diarrhoea without disturbance of the appetite. The reaction was always acid except in some breast-fed children. Volatile fatty acids, lactic acid, acetic acid, and butyric acid were frequently present, the latter sometimes in considerable amount. Frequently, an abnormally high amount of hydrochloric acid was present. Pepsin was usually found. Curdling ferment was always present.

One of the most constant accompaniments of dyspepsia was the lengthened stay of the milk in the stomach. In one case the author found 20 cubic centimetres (5 drachms) of milk,

highly acid and containing fatty acid, seven hours after feeding. A similar condition was found in chronic dyspepsia and in diarrhoea. This atony of the stomach is apparently not the cause but the result of the disease, for the slowness of the emptying process continued for several days after subjective or objective symptoms. Tough mucus was present frequently both in acute and chronic dyspepsia. In 2 cases there were large coagula, consisting of mucine, in which epithelium, yeast-cells, and large quantities of bacteria were inclosed. On the introduction of the sound, gases escaped even in healthy infants.

Two points are insisted upon: first, it is easy to understand from these experiments why, in dyspepsia of children, hydrochloric acid either is without effect or acts harmfully; secondly, the impropriety of giving pepsin.

The author's experiments show great benefit from washing out the stomach, because it is a certain means of removing the contents and compensating a dyspepsia. It is unattended by danger. He uses water, or water with a weak alcoholic solution of thymol added. Diluted milk or milk-gruel was the diet which suited most cases best. The results of stomach-washing were, in his hands, very favorable. Often one washing sufficed; in many other cases only two; rarely were as many as three required. Vomiting ceases in a surprising way and the appetite returns. The best results were obtained in the cases of acute gastritis, where, frequently after one washing out, both fever and convulsions ceased. Less favorable results were obtained in cholera infantum, but generally satisfactory ones. Cases of habitual vomiting gave very good results, and in many cases of obstinate diarrhoea the washing with a thymol solution was beneficial.

Seibert,⁵⁹ in a paper read at the American Pediatric Society upon the mechanical treatment of the gastro-intestinal disorders of infants, reports upon 521 cases of stomach-washing with highly satisfactory results. He states¹⁵⁰ that the removal from a stomach and intestines of residual masses of food, and their accompanying bacteria and ptomaines, is the first and most important indication in acute gastro-intestinal catarrh. Even when there is no nausea, stomach-washing is indicated. Collapse is no contra-indication. On the contrary, the deeper the collapse, just so much more rapidly and energetically must stomach- and intestinal washing be carried

out. In older children stomach-washing may be replaced by allowing a child to drink freely of cold water, and then inserting the finger into the fauces, making pressure at the same time upon the stomach, the head being inclined forward. Seibert believes plain water to be the best fluid for both stomach and intestinal irrigation. Antiseptics are dangerous and uncertain. The object should be to use a large amount of fluid and to flush the organ completely.

Faucher¹⁰⁰ _{Dec. 13, 88} has used this procedure extensively, and recommends it even in newly-born infants. The head should be inclined slightly forward. There is no difficulty in introducing the tube, it being as easy as in adults. The suction movements made by young infants are decidedly an advantage. A single case is reported showing the marked influence of this treatment, unaided by drugs. The child was 27 days old; emaciated, constipated, and vomiting everything. The most marked relief followed the first operation, and without the use of medicine the case recovered completely. The mother was taught to wash out the stomach herself, and continued it without difficulty during convalescence.

Jacobi,⁵¹ _{Aug.} in discussing the treatment of chronic gastric catarrh, speaks in the following guarded way about this therapeutic measure: "Occasionally irrigation of the stomach may be resorted to with advantage."

With reference to stomach-washing in acute gastro-enteritis, he says⁵¹ _{Sept.}: "When the process of fermentation is still limited to, or going on in, the stomach, or the stomach still contains injurious masses, these ought to be brought up. In such a case the sound judgment of the practitioner has to decide whether emesis is still useful or whether the stomach ought to be irrigated and washed out. Most cases of gastro-enteritis are pre-eminently enteritis; therefore the claim that the washing out of the stomach must not only take place in every case, but is the almost infallible remedy in the very worst class of cases, will have no other result but that of discrediting that useful procedure in the eyes of those who are inclined to believe implicitly in the value of 'new' methods and the pretentious claims of short-sighted enthusiasts. In fact, the injurious element is, in most cases, beyond the reach of the stomach-pump; indeed, the latter cannot remove anything but what is dissolved or suspended; the expulsion of large masses, curd particularly, through an elastic catheter is out of the question."

DILATATION OF THE STOMACH.

Jacobi⁵¹ mentions the following as among the most potent causes: Overfeeding, especially with amylaceous material; muscular debility, associated with rickets; voracity, imperfect digestion, and flatulent dyspepsia; catarrhal gastritis; general muscular weakness, associated with anaemia and convalescence; congenital defects in muscular tissue and peritoneal adhesions.

In treatment he advises drugs diminishing fermentation, like bismuth, nitrate of silver, calomel, and resorcin. The quantity of food given at once should be small, but the meals should be numerous. Fats and starches are to be especially avoided. Large amounts of fluid should not be given. Milk in small quantities must be given often. Diarrhoea may require tannin and other astringents; it depends upon the condition of the stomach; indeed, most cases of consecutive diarrhoea will be best treated by attending to the stomach. Raw beef is among those articles of food which are most easily digested, and beef-peptones are very useful. Raw milk is not so easily digested as boiled. Peptonized milk is preferable in many cases. Rudisch's preparation will do well because of the ease with which it is digested. A bandage should be worn about the abdomen. The faradic and galvanic currents can be used with advantage. According to Ewald, electricity and massage accelerate the passage of chyme into the intestine. It seems to Jacobi, however, that it is questionable whether digestion was improved by them, for it may be that both of these applications resulted in premature opening of the pylorus before the gastric digestion was finished. Preparations of nux vomica—the tincture—or strychnia, in three daily doses of from $\frac{1}{2}$ to $\frac{1}{6}$ grain (0.0005 to 0.0010 gramme) each, will improve the muscular tone of the stomach.

THE COELIAC AFFECTION IN CHILDREN.

Etiology.—Gibbons³⁶ Oct., Nov. describes this affection, not generally recognized in text-books, but he believes common in clinical experience. It is popularly known among hospital patients as "consumption of the bowels." It is characterized by the passage of large, loose, white, frothy and intensely fetid movements, by pallor of the skin, wasting, loss of strength. It is most frequently met with between the ages of 1 and 5 years. The youngest case

observed was between 10 and 11 months old. It was seen in families where parents and other children were perfectly healthy. There was no evidence of tuberculosis or other hereditary disease. Occasionally, a history of gout was obtained in some members of the family. Tubercle bacilli were never found in the stools, although frequently sought for. No cause up to the present time has been discovered. The author states that this is not the disease commonly known as chronic diarrhœa in children. It is seen among the rich as well as among the poor. His explanation is that it is a perverted action of the liver, of nervous origin, and probably also that the pancreas is similarly affected. The food is hurried along the intestinal tract and undergoes active decomposition, the movements from the bowels being usually large in proportion to the amount of food taken. His conclusions are: 1. That the pathological anatomy teaches us nothing regarding this disease. It is to be looked upon as a functional disturbance of the nerve-supply of the liver, pancreas, and intestinal glands; possibly, also those of the stomach and salivary glands. 2. That, as this causes serious alteration in digestion, food is readily decomposed and ptomaines formed, the absorption of which into the blood produces the profound ill health from which these patients suffer.

Pathology.—Post-mortem examinations have failed to reveal, thus far, anything abnormal either in the gross appearances or microscopic changes of the intestines.

There is little difficulty in the *diagnosis*, the one important thing being to examine the movements from the bowels for one's self, and the characters above described are very constantly seen. There is usually no sign of an ordinary diarrhœa, the stools not being more frequent than normal, and nurses often insist that the bowels are regular.

The *prognosis* is usually grave, the majority of the children dying from the disease. Unless everything in the way of diet, change of air, and hygienic treatment can be carried out, most of the cases prove fatal.

Symptoms.—The onset is usually gradual, with nothing definite to call attention to the disease. The child is pale and anæmic, the stools being pale in color and of an intensely foul odor. Occasionally, there are intercurrent attacks of diarrhœa, but diarrhœa

is not an essential part of the disease. The appetite is poor, often capricious; tongue frequently coated, sometimes clean. In some cases there are frequent attacks of abdominal pain. The abdomen is usually soft and doughy, occasionally distended. The spleen is rarely found to be enlarged; the lymphatic glands are normal. The temper is irritable; sometimes this condition alternates with heaviness and languor. A marked symptom is loss of muscular power, although there is not much emaciation. The limbs are soft and flabby. There is progressive wasting, but the progress is slow. If recovery takes place it is only after a prolonged course of treatment, and its progress is frequently interrupted by relapses. The slightest error in diet is often enough to bring on a marked relapse.

Treatment.—This is to be mainly dietetic. The curd of cows' milk cannot be digested, and asses' milk should be ordered whenever possible. Whey made from cows' milk may be used as a drink. The principal meal should be pounded raw meat; rusk with fresh butter may be tried. All starchy foods are injurious; peptonized foods are of but little value; malted foods are useful. Hydrochloric acid is often a useful addition to the preparation of the meat. In drugs the principal reliance is upon bismuth, with opium added when the bowels are loose and watery. The tonic treatment by iron, cod-liver oil, etc., is needed in almost every case. Almost nothing can be accomplished with drugs where proper dietetic treatment cannot be carried out.

DIARRHŒAL DISEASES.

Etiology.—Henry Tompkins, ² _{July 27} cites the following figures as against the popular impression that summer diarrhoea is a disease chiefly of infants and young children. The mortality is almost entirely confined to them, but persons of all ages, occupations, and positions suffer. Of 24,157 cases recorded during the past four years, 16,506 were over 10 years of age. Only 1219 were under 1 year of age.

Turning to the deaths from the disease, he finds that, out of a total mortality of 837, 725 cases were under 1 year. The author's observations have been made in Leicester, England.

During the last three years he has recorded, twice daily, the temperature of the earth at 1-foot and 4-feet levels during the

warm months. These observations bring out very clearly the fact that it is not until the earth at a depth of 1 foot has reached about 60° F. (15.55° C.), or some 4° F. (2.2° C.) less than this at 4 feet, does diarrhoea begin to prevail in Leicester to any marked degree. Tompkins regards the temperature at 1 foot as the most significant.

It is interesting to note that Edward Ballard reaches the conclusion, from observations made in the same town of Leicester, that the temperature at 4 feet is the significant one.

Ballard¹,_{Aug. 3} concludes that the temperature of the soil is the key to etiology; that summer diarrhoea does not become prevalent until the temperature of the soil, at the depth of 4 feet, has risen to 56° F. (13.36 C.). The quality of the soil also should be taken into account. A porous soil is a better medium for bacterial growth and retains more moisture. Hence, towns so situated are more likely to have diarrhoeal diseases prevalent. Improper food and artificial feeding are given their due prominence as exciting causes. He advises disinfection of the discharges, as in typhoid fever, and also calls the attention of the health authorities to the condition of sewers as a cause. Klein, who was associated with Ballard in the investigation, made many microscopical investigations. His reports concerning the search for micro-organisms in the blood, tissues, etc., were negative.

I. M. Snow¹⁷⁰,_{Sept.} presents some statistics from diarrhoeal disease and infant mortality in the city of Buffalo. Thirty-one per cent. of the deaths under 1 year of age were from acute intestinal disease. He found no constant relation between a high average temperature and the number of fatal cases; thus, in July, 1886, the mortality was 158, the average temperature being 69.4° F. (20.77° C.), while in July, 1887, the mortality was 265, with an average temperature of 68.4° (20.22° C.). The mortality line in the city of Buffalo follows the line of minimum temperature with great regularity.

The following table gives the number of deaths for July and August for three years as compared with the average and minimum temperatures, showing that the death-rate in children from acute intestinal diseases does not depend upon the heat of the summer, but follows the minimum (night) temperature with great regularity:—

TABLE OF TEMPERATURES FOR JULY AND AUGUST, 1886, 1887, AND 1888.

	Deaths.	Mean Average Temperature.	Average Minimum Temperature.
1886 { July	144	69.4° (20.77° C.)	60.3° (15.72° C.)
{ August	141	67.2° (19.55° C.)	60.3° (15.72° C.)
1887 { July	265	68.4° (20.22° C.)	67.5° (19.72° C.)
{ August	168	74.6° (23.36° C.)	64.2° (17.88° C.)
1888 { July	189	67.4° (19.66° C.)	59.6° (15.33° C.)
{ August	212	67.4° (19.66° C.)	64.0° (17.77° C.)

The influence of humidity and rain-fall was studied for two years. So far as these two years show anything, it is that cholera infantum is much more prevalent in a dry than in a wet season. He found, as other observers have found before him, that density of population bore no constant relation to the number of cases and the number of deaths.

The table shown (page 17) is taken from Dawson Williams.¹⁴⁷ These two years employed are chosen for comparison, since 1887 was exceptionally warm and dry and 1888 was unusually cold and wet. The table shows, further, that the endemic prevalence of diarrhoea in London occurs with a lower temperature than 60° F. (15.55° C.).

Very little progress, if any, has been made during the last year in the isolation of intestinal bacteria. We are as far as one year ago from knowing positively that any one form has any constant relation to any one of the varieties of diarrhoea which are found, although the general belief in the bacterial origin, particularly of summer diarrhoea, seems strongly established. The relation of bacteria generally to diarrhoeal disease was discussed by me.¹⁴⁸ The following points are laid down:—

In estimating the influence of bacteria, there must be taken into consideration, first, the nature of the germ; second, the dose, or the number entering the system; third, the susceptibility of the individual.

The small number of varieties of bacteria which have thus far been found to be constantly present in the healthy intestine leads us to believe that the exclusive diet has much to do with their presence and the exclusion of others; consequently, a change in the diet, or, in fact, anything which increases the amount of

TABLE SHOWING NUMBER OF DEATHS IN LONDON FROM DIARRHEA IN TWO CONSECUTIVE YEARS.

1887-A WARM SUMMER.

No. of Week.	Week Ending.	DEATHS FROM DIARRHEA.			Range of Minimum Temperature of Air.	Mean Weekly Temp. of Air.	No. of Week.	Week Ending.	DEATHS FROM DIARRHEA.			Range of Minimum Temperature of Air.	Mean Weekly Temp. of Air.
		0 to 1 Year.	1 to 5 Years.	All Ages.					0 to 1 Year.	1 to 5 Years.	All Ages.		
31	May 28	4	5	10	35.9 to 47.0	42.8	21	May 26	6	1	9	40.6 to 46.0	43.2
22	June 4	5	3	12	44.4 to 50.8	47.5	22	June 2	9	2	19	35.0 to 50.6	44.3
23	June 11	2	7	9	43.4 to 54.8	49.6	23	June 9	12	2	18	46.5 to 53.6	49.8
24	June 18	10	4	20	47.9 to 53.6	51.0	24	June 16	10	3	16	46.3 to 50.0	47.8
25	June 25	21	4	30	44.0 to 51.7	49.1	25	June 23	15	3	18	45.5 to 54.5	48.1
26	July 2	43	4	52	42.5 to 55.5	51.0	26	June 30	21	5	36	49.2 to 60.1	54.3
27	July 9	107	17	138	50.9 to 60.0	55.3	27	July 7	29	14	51	46.2 to 54.7	50.8
28	July 16	165	33	212	55.0 to 59.2	57.3	28	July 14	60	7	72	42.8 to 55.1	48.2
29	July 23	389	73	483	44.8 to 57.4	49.7	29	July 21	46	7	62	48.6 to 55.1	52.8
30	July 30	435	59	517	51.7 to 58.9	55.5	30	July 28	68	15	89	49.2 to 56.1	53.8
31	Aug. 6	354	60	436	46.3 to 54.1	49.7	31	Aug. 4	105	11	121	45.8 to 53.0	50.4
32	Aug. 13	330	55	419	50.8 to 57.4	54.3	32	Aug. 11	104	26	138	47.1 to 59.0	54.3
33	Aug. 20	259	40	316	41.0 to 53.3	48.5	33	Aug. 18	128	24	162	45.2 to 55.5	48.6
34	Aug. 27	148	25	191	45.9 to 60.1	51.2	34	Aug. 25	138	42	192	45.7 to 54.5	51.8
35	Sept. 3	97	23	132	51.8 to 58.9	55.9	35	Sept. 1	112	24	144	41.5 to 52.3	48.4
36	Sept. 10	72	15	107	49.7 to 54.5	48.9	36	Sept. 8	96	29	131	45.0 to 57.0	51.2
37	Sept. 17	55	8	73	43.1 to 52.2	47.4	37	Sept. 15	87	26	122	41.4 to 53.0	44.7
38	Sept. 24	33	5	45	43.3 to 50.1	47.0	38	Sept. 22	60	15	78	47.1 to 54.3	50.0
39	Oct. 1	27	9	43	33.6 to 47.7	40.9	39	Sept. 29	61	13	77	45.6 to 55.4	49.9
40	Oct. 8	10	5	18	43.8 to 49.0	47.5	40	Oct. 6	52	15	72	29.7 to 38.5	33.5
41	Oct. 15	13	3	24	25.8 to 46.3	35.0	41	Oct. 13	31	8	43	27.9 to 42.1	36.2
42	Oct. 22	4	2	11	26.8 to 33.5	35.0	42	Oct. 20	24	10	42	31.4 to 39.7	34.4

1888-A COLD SUMMER.

No. of Week.	Week Ending.	DEATHS FROM DIARRHEA.			Range of Minimum Temperature of Air.	Mean Weekly Temp. of Air.	No. of Week.	Week Ending.	DEATHS FROM DIARRHEA.			Range of Minimum Temperature of Air.	Mean Weekly Temp. of Air.
		0 to 1 Year.	1 to 5 Years.	All Ages.					0 to 1 Year.	1 to 5 Years.	All Ages.		
2683	459	386	.	.	.	.	1274	302	1712	.	.	.	.

unabsorbed food in the intestines, may lead to development of new forms of bacteria. This may occur in any one of the following ways: first, by failure in digestion, which may be either acute or chronic; secondly, by overfeeding; and, thirdly, by improper food. In all cases, masses are present in the intestine, which readily undergo decomposition at the temperature of the body. Their presence there always means the possibility of the growth of many new forms of bacteria.

The effect of the introduction of pathogenic germs will depend upon the resistance of the patient and the number of germs introduced. As the resistance of patients varies greatly, no constant result follows the introduction of a given number of germs. The number which can be taken into the intestines of a strong individual with healthy organs is undoubtedly pretty large. A much smaller number in a delicate individual of feeble constitution may be sufficient to set up the most active decomposition, with serious results.

The most important local condition favoring the development of new germs in the intestines seems to be a previously-existing intestinal catarrh, which may be very mild in degree. When this is present the new germs develop with great rapidity, and often with dangerous results. We do not know, however, of any anatomical or physiological conditions different in the intestinal tract of later childhood which is sufficient to explain the immunity of children over 2 years of age; and we must believe that such children escape diarrhoeal diseases in summer, mainly, because of the greater resistance to the development of germs.

The things essential to bacterial growth are the entrance of living germs in numbers and a proper soil for their development. In the prevention, we must have regard to both these conditions. The most unfavorable soil for the development of pathogenic germs is a healthy intestinal tract and normal powers of digestion. The prevention must then have regard to everything connected with infant feeding and infant hygiene. Proper food, regular feeding, no overfeeding, and prompt attention to all the minor derangements are absolutely essential.

In the discussion of this paper, H. M. Biggs stated that there seemed to be three forms of diseases in the intestines dependent, directly or indirectly, upon bacteria. In the first class the disorder

arose from the absorption of ptomaines formed outside of the body and taken in with food. In the second class it was due to saprophytic bacteria taken in with the food and causing it to ferment. In the third class it was caused by specific germs which acted directly upon the mucous membrane of the intestinal tract. The first class was illustrated by the following experience: Two-thirds of the inmates of an asylum were suddenly seized with vomiting and diarrhoea, lasting from six to forty-eight hours. The weather was hot. Investigation revealed the fact that the cause was tainted meat, which, by mistake, had been left out of the ice-house for two of three days.

As an illustration of the second class, he cited a case of sporadic cholera in an Italian working upon the aqueduct, a few miles from the city of New York, who died after twenty-four hours of severe vomiting and purging. At the autopsy the intestines were found full of a rice-water fluid, similar to the discharges during life; in this fluid there was found almost pure cultures of the bacterium coli commune. This saprophytic germ, although normally present in the intestines, apparently became, under certain unknown conditions, the cause of fatal disease.

Tompkins² reports the following observations on bacteria in the air in diarrhoeal districts made in Leicester, England. In one portion of this town diarrhoeal diseases have been for several years exceedingly prevalent. All ages, stations, and occupations have been attacked. The food- and water-supply are practically the same throughout the town. Tompkins believes contaminated air to be the direct causative agent. With this in view, he has made some experiments to ascertain the relative number of germs present in the atmosphere in different parts of the town, and also in the diarrhoeal region, before and during the epidemic. While diarrhoeal diseases were prevalent, from two to three times as many microbes were found in the air as before and after this period. In the diarrhoeal region there were fourfold as many as in other districts where the disease did not prevail. None of the bacteria have been isolated or worked out, and the mere presence of germs in quantity is no positive proof of their causative agency; so that we cannot regard the writer's experiments as creating anything more than a presumption in favor of his theory.

In considering the subject of diet, Iedeschi⁸² has published

statistics of 9083 children, 3012 of whom were under 1 year, 2001 were nursed by the mother, 211 by wet-nurse, and 800 fed upon artificial foods; of 507 nursed entirely, 56 cases had rickets; of 1705 partly nursed and partly fed, 993 cases had rickets; of 800 artificially fed, 693 had rickets. These were children under 1 year. As to cholera infantum: of the nursing children, 21 per cent. were affected; of those partly nursed, 41 per cent.; of those fed artificially, 55 per cent.

Prophylaxis of Diarrhœa.—I have called attention⁹ to the fact that in a considerable proportion of children dying after a mild dyspeptic diarrhœa had existed for some time organic changes of considerable importance may be found. These consist mainly in a swelling of the solitary lymph-nodules of the intestines. I believe this to be a tolerably frequent condition, and one which predisposes strongly to intestinal ulceration. In many children in whom intestinal ulcers, as a result of severe summer diarrhœa, were found, a history existed of a prolonged antecedent dyspeptic diarrhœa. Two autopsies were reported,—one upon a child who was killed by a fall and died within a few hours, and another upon a child dying of acute pneumonia, after a short illness, unaccompanied by any intestinal symptoms. In both these cases the solitary lymph-nodules throughout the colon were found very greatly enlarged, but unaccompanied by any evidence of inflammation other than the swelling. The first child had suffered for several weeks previously from an ordinary mild dyspeptic diarrhœa; the second had always abnormal stools, generally green, with some mucus, until it was 5 months old, but then had normal stools till death, at 10 months.

The ground taken in this paper is that it is important for every case of dyspeptic diarrhœa to receive careful attention, even though it be mild, and that the prevalent practice of neglecting these cases on the score of existing dentition is a pernicious one, since in this way these lymphoid swellings might occur, which persist a long time, and which readily break down into ulcers from an attack of acute inflammation. The experience in the New York Infant Asylum, here recorded, was that a large proportion of the fatal cases of diarrhœa occurring in summer gave a history of frequently recurring mild attacks, or a mild chronic diarrhœa for weeks, often for months, previously. The treatment of intestinal

ulceration is exceedingly unsatisfactory: prevention is much more successful.

Davis,⁹ _{July 6} emphasizes the following points in prophylaxis: first, care of the skin, to secure proper physiological activity, and also frequent bathing and keeping the body at an equable temperature by proper clothing; secondly, cleanliness with reference to everything about the child; thirdly, pure food, sterilization of milk being strongly insisted upon as the best-known means of securing it; fourthly, careful disinfection of diapers and discharges during the hot season.

Treatment of Infantile Diarrhoea.—Nothing especially new has been brought forward during the year in the treatment of infantile diarrhoea. Most of the authors who have written upon the subject during the year have done little more than to emphasize and repeat generally-received methods.

Opiates seem to be falling more and more into disuse, particularly in the cases of "summer diarrhoea;" vegetable astringents have been found by a large number entirely worthless.

Irrigation of the colon has come to be quite extensively practiced in this country, and is believed by nearly all who have used it thoroughly to be of real advantage in the management of these cases, although few of our writers have found from it the marvelous benefits which some German authorities claimed in the beginning.

Evacuants are used extensively by almost every writer in the preliminary stages, calomel being the favorite with, perhaps, the largest number, although castor-oil is extensively used. Rhubarb and salines have also their advocates. In the later stages of diarrhoeal disease the majority of writers still have directed their attention to the use of antiseptics of one form or another, and these are believed to exercise some special influence in the control of these cases.

The subject of diet in diarrhoea is still a very complex and difficult problem, and we cannot say that any great advance has been made toward adapting the diet to individual cases, or classes of cases. The proposition of Escherich, to administer to all cases having foul stools a diet consisting of carbohydrates,—dextrin, sugar, etc.,—and to all cases with thin, sour stools albuminous foods, has not been followed out by any one with sufficient

exactness and care of detail to enable us to tell precisely what this dietetic treatment alone will accomplish. It becomes more and more evident every year, to one studying literature of diarrhoeal diseases, that very little progress will be made in the practical study of these diseases until some uniform basis of classification and nomenclature is adopted. The greatest confusion still prevails, so that it is impossible to tell from the name the writer gives to his diagnosis exactly to what class of cases he refers. Generally speaking, writers prefer to generalize from a large number of cases rather than introduce particulars of a much smaller number.

The following drugs or methods of treatment are referred to more or less fully by writers during the year:—

Kolbasenko⁵⁷¹_{so.39."ss} reports 26 cases, from 6 to 18 months of age, treated by *oxide of zinc*. Only 2 proved fatal. In 24 there was speedy recovery. The drug was given in $\frac{1}{2}$ -grain (0.032 gramme) doses, hourly, in combination with astringents. Stimulants were also used and the diet carefully regulated. Although the writer is firmly convinced of the value of this method of treatment, his cases are hardly conclusive.

Waugh¹⁹¹_{July} states that he has used *sulphocarbolate of zinc* extensively in summer diarrhoea, for three seasons, and still thinks very highly of it. He believes it to be the most effective intestinal antiseptic. It is indicated when stools are offensive and thin. The dose is $\frac{1}{2}$ to 2 grains (0.032 to 0.13 gramme) every two hours.

Humphreys⁸⁵_{Aug.} has had better results from *salicylate of calcium* than from any other method of treatment. He uses the following formula:—

R Salicylic acid, gr. xxij (1.43 grammes).

Cretæ preparatæ, gr. viij (0.52 gramme).

M. et div. in chart. no. vij.

One every two hours, given in water.

Carhartt⁷²_{June} used this drug in "15 cases of violent diarrhoea," and in every case with highly satisfactory results. Its effect was nearly always prompt and decisive. In 6 of these cases he states that he had previously used all other means in his power to control the diarrhoea before giving the salicylic preparation, but without effect. He has recorded, in all, 40 cases of cholericiform diarrhoea in which he has used the drug in every case with the best success. He uses the following formula:—

R Salicylic acid, gr. xxx (1.94 grammes).
 Cretæ præcip., gr. x (0.65 grammes).
 Glycerinæ, 3j (4.00 grammes).
 Aq. rosæ, 5xv (54.00 grammes).
 M. Sig. : A teaspoonful every hour to a child 1 year old.

Very marked improvement usually occurred after five or six doses; although highly successful in the treatment of serous diarrhoea, the salicylate of calcium was found to be of little value in other forms.

Ayers⁶⁴⁷ _{July} reports better results from *salicylate of solu* than from any other method employed. No details of his cases are given.

W. L. Carr⁵¹ _{Sept.} reviews the whole subject of the use of *salol* in intestinal diseases, and gives his experience in 35 cases of diarrhoeal disease treated in a dispensary. He finds it to be best administered in a solid form combined with some inert powder. No unpleasant effects were produced. It is best used in the first stage of gastro-intestinal catarrh. It is also beneficial in chronic diarrhoea, where larger doses should be given before meals. Carr found the drug of but very little value in those cases characterized by dysenteric passages, and also very poor results where the stools were of a pure serous character. In general, the best results were obtained where the stomach and upper bowel were the seat of disease.

Brothers²⁷ _{Apr.} used salol in a series of cases, but found it very unsatisfactory. Only 16 children for whom it was prescribed returned to report the results of treatment. Only 3 or 4 were distinctly improved. In the majority of the cases it was found necessary to change the treatment.

C. R. Illingworth, of Accrington, Eng., collaborator, writes concerning the great benefit he has seen from the use of *biniodide of mercury*, particularly in the green diarrhoea of infants. Luff² _{Nov. 16} also obtained very beneficial results with the biniodide; $\frac{1}{50}$ grain (0.001 grammes) doses were given, usually in a solution of iodide of potassium. Eighty cases of acute infantile diarrhoea were treated by Luff by this method. In 72 cases the diarrhoea was cured in two days. In no case did the diarrhoea continue beyond the seventh day. It is to be regretted that more particulars are not given regarding the class of cases in which the drug was used. This report sounds almost too good to be true.

Ayers⁶⁴⁷ _{July} speaks of most excellent results obtained from the use of $\frac{1}{160}$ to $\frac{1}{120}$ -grain (0.0006 to 0.0005 grammes) doses of *bichloride of mercury*.

In addition to its use as a cathartic, in the initial stage, *calomel* is used largely throughout the disease, particularly in the summer cases. E. P. Davis, ⁹ July, Claiborne, ⁴⁰ Aug. and Jacobi ⁵¹ all speak in high terms of this drug in $\frac{1}{16}$ to $\frac{1}{20}$ -grain (0.006 to 0.003 gramme) doses, frequently repeated. It has been found most useful in the early part of the disease, particularly when the stomach is disturbed.

Stockwell, ⁸⁰ _{Sept.} considering that in almost all cases of infantile diarrhoea we have the functions of digestion very greatly impaired, advocates a more careful and systematic trial of *pepsin*, *pancreatin*, etc., than have hitherto been made.

Lichtermann ⁶⁸³ _{No. 29} speaks very highly of *cocaine* in the diarrhoea of nurslings. He gives $\frac{1}{6}$ grain (0.01 gramme) every two hours, generally in combination with bismuth. He has seen no unpleasant effects, even in very small infants. It is stated to be especially good where there is much vomiting.

Jacobi ⁵¹ _{Sept.} states that *opium* diminishes hypersecretion, hyperperistalsis, and hyperesthesia of the bowel. It is an invaluable means in the treatment of all diarrhoeal diseases, and the objections to its use are theoretical only. He prefers Dover's powder as the form in which to administer the drug, but finds the doses of $\frac{1}{16}$ to $\frac{1}{3}$ grain (0.006 to 0.021 gramme) usually ample for the effect required. It is to be used with discretion, and only to control the symptoms above indicated. The time to give opium has come when the odor of the evacuations begins to assume the normal character, but it finds no contra-indication in the cases of follicular enteritis which last for weeks, even when discharges continue foul.

In the discussion upon cholera infantum at the American Medical Association in June, ⁹ July, nearly all of those who took part spoke of the great value derived from hypodermics of morphine in combination with atropine. Larabee, Luff, Meyer, and others insisted that this disease should be sharply distinguished from the ordinary cases of summer diarrhoea. For the reduction of temperature in cholera infantum, cold was worth more than all the drugs.

Stockwell ⁸⁰ _{Sept.} very justly condemns, in quite strong terms, the routine use of the *stringents*, particularly the tannin preparations, in the treatment of diarrhoea. Jacobi ⁵¹ _{Sept.} excludes them from acute cases when the stomach is involved. This class of preparations certainly is capable of doing much harm, and the

sooner their indiscriminate use is dropped from the therapeutics of diarrhœa, the better it will be for most of our cases.

Irrigation has been used with good results by Babcoek. ⁵⁹ _{July 13} He prefers lukewarm water. Davis ⁹ _{July 6} advocates the use of water at a temperature of 90° F. (32.2° C.), and, in cases of collapse, of hot injections, even up to 110° F. (43.3° C.). We can hardly help wondering if the author has ever really injected water at 110° F. (43.3° C.) into the rectum of a child.

George Rice ¹⁵ _{Dec. 1888} reports 7 cases in which he has used *glycerin injections for obstinate cases of prolapsus ani*, complicated with diarrhœa. In children from 2 to 7 years of age, 2 drachms (7.8 grammes) were usually injected. From one to two applications were all that were usually required. Immediate improvement in the symptoms was almost invariably seen after the first injection. A favorable influence was also exerted on the diarrhœa.

Peter Hooper ⁵¹ _{Aug.} speaks highly of the use of *cold* applied to the spine in cholera infantum; also of cold compresses to the head and the use of the cold bath. He also advocates the giving of cold water freely by the mouth. Vomiting is often increased at first, but the secondary effect is a sedative one, and the procedure serves as a valuable substitute for stomach-washing.

Treatment of Dysentery.—Jacobi ⁵¹ _{Jan.} advises, in the beginning, either castor-oil or calomel, and cold applications to the abdomen, and considers that nothing can replace opium, pushed to tolerance, where intestinal ulcers exist. A tolerance equal to that in peritonitis is sometimes seen. Irrigation of the bowels should be made frequently with tepid solutions. Alum or tannic acid, 1-per-cent. solution, may be used, and, in chronic cases, silver.

• CONSTIPATION.

Craigen ¹⁸⁶ _{July} speaks highly of the results obtained from $\frac{1}{6}$ minim (0.01 gramme) of the tincture of belladonna, repeated three times a day. The beneficial effects are seen sometimes in two days, sometimes not until three or four.

Vernon ²²⁴ _{Nov. 9} writes regarding constipation in childhood as a result of diarrhœa. One autopsy is reported in which great dilatation of the colon had resulted. The constipation following diarrhœa the author believes to be from atony and paresis of the muscles of the bowel, caused by excessive and long-continued

irritation of diarrhoea, in which the result is diminished peristaltic action, accumulation of feces, dilatation of the entire bowel or in certain parts, and reflex symptoms from interference with the other functions of the body. The treatment is to be by tonics and not cathartics. Strychnine, ergot, phosphorus, and iron are valuable in the order named. In addition, it is advised to wear a snugly-fitting flannel jacket around the abdomen to support the abdominal walls and protect them from changes of temperature.

DISEASES OF THE LIVER.

Catarrhal Jaundice.—Kraus¹⁵⁸_{B.10,p.231} reports 13 cases of catarrhal jaundice in children, ranging from 1 to 12 years of age, treated, without drugs, by the use of the faradie current, daily applications of five minutes being usually made. One electrode was placed over the gall-bladder and the other over the spine at the same level, or the two electrodes were grasped with one hand and applied in the region of the gall-bladder, and a current used which was powerful enough to excite strong contractions in the abdominal muscles. A milk diet was usually ordered.

The results showed striking improvement; after one or two applications, the stools, which had showed up to that time no bile, now became dark in appearance. Three cases were treated by the current alone, an ordinary mixed diet being allowed. In these cases, as well, marked improvement followed after the second *séance*. The average number of applications required before recovery was seven or eight; improvement was almost always marked after the third application.

Angioma.—Martinotti⁴⁵_{52a} reports what he believes to be the second case on record. It occurred in a small child dying at 5 months of age. There was also a spina bifida. The condition of the liver was as follows: Immediately beneath the capsule, an angiomatic tumor, tolerably well defined, showing upon the surface a slight depression with a regular contour. The color differed but slightly from the rest of the liver-tissue. The microscopical examination showed that it was not a case of true cavernous angioma, but that the tumor was made up of connective tissue, in which were small lacunæ lined with endothelium, smaller toward the periphery, but always quite distinct from the capillaries of the liver. The hepatic tissue in its substance presented small canals, newly formed, as in hypertrophic cirrhosis. The rest of the organ was normal.

ANIMAL PARASITES AND THEIR EFFECTS.

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AND

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PHILADELPHIA.

PROTOZOAN PARASITES—RHIZOPODS, SPOROZOA, AND INFUSORIA.

Massiutin,⁵⁸⁶ in an article on "Amœbæ as Parasites of the Large Intestine," first reviews the literature of the subject, and cites Lösch²⁹ as the first to point out the amœba (*Amœbacoli*) as the parasite causing chronic dysentery. In this case the discharges of the patient were injected into the intestines of each of four dogs, with the result that one of the dogs soon exhibited a disturbance of the digestive processes,—vomiting and diarrœa. It soon recovered from this, except that the otherwise normal stools were mixed with bloody mucus containing many amœbæ. Upon a post-mortem examination being made, a catarrhal condition of the mucous membrane was found, in the secretions of which in the large intestine were many amœbæ. Similar intestinal troubles, accompanied by amœbæ in the stools were observed later by the Italian authors, Grassi,⁶¹⁶ Perroncito, and Sontino, although they laid no stress on the amœbæ as the cause of the affection. Koch found the same parasites in his examination of the intestines of patients dead of dysentery in Egypt, and Kartulis arrived, in 1886, at the conclusion that amœbæ were the cause of "tropical dysentery." Ilava, in Prague, came to the same conclusion regarding European dysentery. Kartulis founded his opinion upon the following grounds: 1. He found the parasites present in all cases of dysentery (150), while they were absent in all other forms of intestinal disturbances. 2. He not only found the parasites in the mucus and on the ulcerated surface of the intestines of the subjects, but in the deeper layers as well (submucosa, muscularis). 3. The intensity of the disease stood in direct relation to the number of parasites in the stools. No investigator has as yet

made pure cultures of the parasites, but in many cases the injection of dysenteric stools into the intestines of animals, especially cats, has produced bloody diarrhoea. The author has observed these parasites in five patients troubled with varying intestinal symptoms. Injections of tannin, boracic acid, and sulphate of quinine were administered, as well as doses of bismuth, opium, naphthalin, etc. The best results were secured with the enemata of sulphate of quinine, which was found to be effective in weak solutions (1 to 5000), two weeks' use generally freeing the stools from amœbæ. After detailing the separate cases, Massiutin describes the parasites as granular and usually possessing a nucleus; neither the author nor Kartulis was able to make out any nucleoli, although Lösch describes the nucleoli as varying in size and refractive power. Sometimes as many as six vacuoles were to be seen, and frequently foreign bodies that had been taken in as food, *i.e.*, micro-organisms, detached epithelial cells, and, not infrequently, red blood-corpuscles. The pushing out of hyaline processes was found to be very active when the parasites were examined upon a warm stage, the movements being kept up for from four to six hours.

In most of the cases observed by Massiutin the amœbæ were accompanied by the infusorial parasite, *Cercomonas intestinalis*.

Darier²⁸⁷ publishes a paper entitled "*De la psorospermose folliculaire régétante*," in which he is represented as having observed for the first time a very well characterized disease which may locate on the skin of the human body, preponderating, however, on the hairy portions, as the head and face, the breast, and especially the inguinal region. Darier observed 2 cases in which there first appeared small papulae with brownish-gray crusts; these can be withdrawn only with difficulty from the underlying structures, and then present the appearance of horny, somewhat fatty, cone-shaped masses that had been imbedded in an invagination of the skin. Later, through coalescing, the papulae reach the size of a hemp-seed, making little elevations of the skin that grow larger by coalescence, until they become veritable tumors and begin to ulcerate. A microscopic examination of the papulae shows them to be closely associated with the hair-follicles. While the roots of the hair, with their sheaths and glands, seem to remain unaffected, the opening of the hair-follicle is widened and filled with the horny mass forming the cones spoken of above. These masses indicate ap-

parently a strong hyperplasia of the epidermis; the *rete mucosum* is not conspicuous, however, and a distinct boundary between the epidermis and the *cutis vera* is wanting. The skin papillæ of the immediate neighborhood are uniformly hypertrophied. From the hair-roots cauliflower-like, branched, epithelial cones push into the underlying skin. In the lower portions of the horny masses nearest the hair-follicles the author discovered a great number of cells differing entirely from those about them, and which could not be accounted for as degeneration products of normal histological elements. They consisted of round cells with a doubled limiting membrane, granular contents, and central nucleus, showing a certain similarity to cartilage-cells. In teased preparations the author frequently found these cells inclosed within the epithelial cells, the nucleus of which had been pushed off to one side. The outer portions of the horny cones were found, upon treatment with alkalies, to consist almost entirely of these round cells, which, from their lack of color and different power of refraction, appeared in the skin as horny structures. The author regards these round cells as the psorosperms of Coccidia, and thus recalls the similar observations of Lindemann,⁸⁴⁰ accepted at first by Leuckadt, but afterward considered doubtful.¹²¹¹ Darier recalls the psorospermosis of the liver in rabbits, of molluscum contagiosum, and of Paget's disease of the nipple; and although he concludes from analogy that the disease described by him is due to psorosperms, he is obliged to admit that all attempts to cultivate or transplant the parasitic cells failed, and that one patient suffered from the disease for nine years without his wife becoming infected. Reference is made to a similar case noted by White,²⁴⁵ and described as keratosis follicularis, but not considered a psorospermosis.

A. Pillict¹⁶⁴ gives an interesting review of the present knowledge of the sporozoan parasites of man. He refers to recent communications on the subject, made before the Société de Biologie by Darier, Malassez, and Albaran, the first of which we have already reviewed above. E. Balbiani⁴⁹¹ has made most exhaustive study of these parasites, and his writings, representing his lectures at the College of France during the year 1882, form a most remarkable and valuable monograph. After a brief consideration of the distribution of psorosperms among various invertebrate and vertebrate animals, particular reference is made to those of man, and to

the importance of further study of these wide-spread but comparatively little-known parasites.

CESTODES.

Morphology and Embryology.—C. Claus⁸ gives a valuable and interesting review of the morphology and phylogeny of the tape-worm, pointing out the subordinate individuality of the proglottids and the close relationship of the entire cestode with the trematode; the simplification having been brought through long-continued parasitism, the loss of the alimentary canal, etc. The various metamorphoses, characterized by individualization of certain stages of development are referred to, and the question of alternation of generations, as seen in those young forms which produce a number of cestoid heads, is discussed at some length and compared with alternation of generations as seen in the *Scyphomedusæ*.

Danysz¹⁶⁵ _{Sept. 2; Feb. 16} endeavors to show, by a series of observations, that the so-called *Taenia fenestrata* is nothing more or less than *Taenia saginata*, in which the cuticular tissues, after having undergone fatty degeneration, are digested by the fluids of the host, and the fenestrated appearance thus brought about. *T. fenestrata* was first described in 1780 by Masars de Cazelles, of Toulouse,¹²¹² and in 1862 by L. Colin, of the École du Val-de-Grâce,^{420 363 1213; 420} _{Sept. 10, '62; '62; Dec. 24, '75} and again a few years since by Notta and Marfan.^{426 73} _{p. 63; sc. '86} A criticism of de Cazelles's original paper was presented to the Société de Médecine de Toulouse in 1863 by Guilard, who considered the perforations as the effect of age. Danysz's article is accompanied by a plate illustrating the aforesaid erosions.

M. Braun, of Rostock,⁵⁰ _{May 21, '31} contributes an article on the embryonic development of cestodes. The subject is treated historically and accompanied by a full bibliography. Nicholas Andry is cited as the discoverer of eggs in the tape-worm of man, and C. von Siebold as the discoverer of the spermatozoids of cestodes. The fertilization of the eggs is located by Leuckart in the so-called "Befruchtungsgang," a process of the receptaculum seminis. The more-important general works on the embryonic development of cestodes are then referred to and the details considered under the separate groups, Bothriidae and Taeniadæ.

Geographical Distribution.—C. Kerbert,⁵⁰ _{Oct. 15} after discussing the cases in which bothriocephalus latus has been recorded among the inhabitants of Holland, details his efforts to discover the inter-

mediate host of the parasite. He succeeded in finding its larvæ in the Stint, *Osmerus eperlanus*, which he fed to dogs without producing in them the adult worm. Kerbert⁵⁰_{June 14} endeavors to show that E. Van Beneden is wrong in his assertions as to the frequency of *bothriocephalus latus* in Holland, and calls on Dutch physicians for material with which to settle the question.

Bothriocephalus latus was formerly thought to be limited to Europe until Baelz, in 1878, found it to be somewhat common in Japan. Isao Ijima^{518; 673}_{Sept.} now demonstrates the correctness of the old Japanese belief that tape-worm may be acquired by eating certain fish, particularly the *Buchorhynchus Perryi*. He made successful experiments on himself with the larvæ found in that fish, obtaining a full-grown *bothriocephalus* from his bowels after six weeks.

Colman, of Houston, Texas,¹²⁹_{Oct.} states that tape-worm is increasing with great rapidity in Texas, particularly in the western portions. The people of Texas should follow the example of the Germans and institute at once some stringent regulations as to the inspection of the beef and pork sold in their markets, or they may expect to gain the unenviable reputation held by Algiers and many Mediterranean provinces which have furnished the supply of tape-worm to a large area of Europe. It would be interesting to know something of the frequency of tape-worm in the other States supplied with meat from Texan cattle and swine. The answers from the West given to the inquiry of E. A. Reeves, of Blaine, Washington Territory,¹⁹⁹_{Nov.} so far as they have come to our notice, somewhat confirm the above statement as to the prevalence of tape-worm in this portion of the United States.

L. Duchesne⁴⁷¹_{p. 233} enumerates the tape-worms observed in France as (1) *Tenia solium*, sometimes improperly called the solitary worm, since several specimens are frequently found in the same individual; (2) *Tenia mediocanellata*, which is much more frequently found in numbers, and in people who are accustomed to eat raw beef and pork; (3) *Bothriocephalus latus*, which he declares is easy to recognize and distinguish from the two others, from the fact that when placed in dilute alcohol *T. solium* and *T. mediocanellata* remain white, while *Bothriocephalus* presents a gray coloration, which the naturalist, Pallas, considered of sufficient importance to justify the name *Tenia grisea*. This worm is rare in France, but is frequently encountered in Switzerland.

T. C. Kicer contributes ⁸³_{Jan. 1 and 15} an interesting article on the geographical distribution of *taenia*, with special reference to its occurrence among the Norwegians. The author enumerates the various forms of cestodes hitherto recorded as occurring as human parasites in Norway; he then deals with the distribution of *taenia* in general, and goes on to the detailed consideration of the separate species and the frequency of their occurrence in Norway. The relative frequency of the parasites in male and female patients and in children and adults is shown, as well as the comparative frequency at different seasons of the year. *Taenia solium* and *T. mediocanellata* being the more-frequent forms, and often recorded by the physicians simply as tape-worm without distinction as to species, are treated of by the author under one head. *Cysticercus* appears to be rarely met with, only one case having been recorded since 1860, and this open to doubt. *Echinococcus* has been observed but four times, one of the patients being an Icelander; in 3 cases the parasite was located in the liver, in 1 case under the skin. *Bothriocephalus latus* appears to be met with only among the emigrants from Finland or Swedes from the shores of the Gulf of Bothnia. Among the workers in the copper-mines this holds true, although they number among them many native Norwegians. On the other hand *Bothriocephalus* has been endemic on the Finnish and Swedish shores of the Gulf of Bothnia from time immemorial, while *T. solium* only appears sporadically. The inhabitants of these districts live almost entirely upon fish and sour milk, and it is a noteworthy fact that among the Lapps of the mountain districts *B. latus* is almost entirely unknown; *B. cordatus* occurs occasionally in Northern Norway. *Taenia cucumerina* is unknown in Norway and very rare in Sweden. *Cysticercus cellulosæ* has been observed but twice in man, and *Echinococcus* but once or twice in Sweden. Knabbe is quoted regarding the occurrence of cestodes in Denmark, where *T. mediocanellata*, *T. solium*, *T. cucumerina*, and *B. latus* all seem to be frequently met with. *T. cucumerina* seems to be confined to children between the ages of 2 and 10.

BOTHRIOCEPHALUS LIGULOIDES.

Murata and Isao Ijima report ⁶⁷³_{Sept., 1919} 6 cases of *Bothriocephalus liguloides* (*Ligula Mansonii*, Cobb.), in addition to the 2 cases previously published. All these new cases were observed in

Japan. In 3 of them the worm was passed by the urethra; in 2 it was found in the conjunctival tissues of the orbit, producing inflammation and swelling. In one case its seat was in the subcutaneous tissue of the thigh.

TAENIA.

Waugh,⁷⁰⁰ in one of his clinical lectures, summarizes the symptoms of tape-worm as exhibited in a stout, well-nourished female patient, as follows: Weak feeling in the upper part of the abdominal region; chills and abdominal pain in the morning, upon rising; borborygmus; tympanites; no nausea; good appetite, but not relieved by eating; constipation; dry cough toward evening, of several years' standing; temperature slightly above normal; passes tape-worm joints at stool; between times, itching at anus; while the only absolute symptom is the appearance of stools. The general symptoms are those of intestinal catarrh.

Definite diagnostic symptoms of the presence of tape-worm are so rarely given that a case is cited¹⁸⁶ in which the symptoms were well marked. The patient, a mulatto woman aged 25, experienced, each morning on leaving home, a sense of compression, or "girdle," about the level of the nipple; lasts till 10 A.M., after which feels well; roaring in ears at the same time; memory poor; some nausea, preceded by rumbling and "movements" in the abdomen, probably due to knowledge of worm's presence; appetite too good, especially at dinner; tongue normal; bowels fairly regular; menses sometimes very free, lasting a week; sometimes insomnia; vision defective—right eye quite so; worse when she had headaches, which are frequent, sometimes daily. Lately has been unable to sit out of windows to clean the outside on account of vertigo. She was ordered 1 ounce (31 grammes) of Epsom salts at bed-time, 1 drachm (4 grammes) of oleoresin of male fern in capsules on rising, with a drachm of ether in simple elixir, to be taken at the same time; and two hours later an ounce (31 grammes) of castor-oil, with 30 drops of turpentine. No food was to be taken until the oil ceased to operate. The next evening she passed the worm, nearly 12 feet in length, with the head. It was unbroken, having been passed into a bucket of warm water.

Taenia in Children.—Bérenger-Féraud⁶⁷ instances a case of the employment of pelletierine (Tauret) for the removal of tape-worm from a child of 42 months, the results being satisfactory in every way.

Mensinga, of Flensburg, ⁵⁷ _{Apr. 28; July 13} ⁶¹ reports a case of *Tænia solium* in a child 10 weeks old. The child was being fed on milk taken from a pail used alternately in the slaughter-house and dairy, without cleaning, the meat from swine slaughtered at this same place having been condemned by the authorities as measly.

Descroizilles and Duchenne ²⁵ _{June} give the following formulæ for tænicides in children's cases: Rx Ext. filicis liq., 5ss to 5ij (2 to 12 grammes); ess. anisi, ¹/₂ x; aqua menth. pip., 5ss (2 grammes); aqua camomelis, 5j (31 grammes); syr. simpl., 5vj (23 grammes); syr. aurant. cort., 5vj (23 grammes). Rx Ext. filicis liq., 5j (4 grammes); hyd. subchlor., gr. vij (0.45 gramme); sacchari, 3ij (7.8 grammes); gelatin, q. s. to make a jelly of a proper consistency.

Gautrelet, ²⁴ _{May 31} in a discussion following a communication by Duchesne on the treatment of tænia, made before the Société de Médecine Pratique, February 21st, reported a case of hydatids of *Tænia eucumerina* of the dog, found in a young girl. He attributes this to the common habit of caressing pet dogs.

Descroizilles, of the Hôpital des Enfants Malades, ³ _{Jan. 9} cites 3 cases of tænia in children. In answer to the question as to what symptoms give evidence of the presence of tænia in children, he says that it is rare for parents to detect the earlier symptoms. They often speak of nervous troubles, or of dullness, of twitchings, of gastralgia; these symptoms are, however, exceptional. Bulimia is sometimes present, but is not by any means frequent, while pallor, emaciation, alternating diarrhoea, and constipation may be considered as pretty constant symptoms. Although choreic symptoms are at times produced by the presence of tænia, yet Descroizilles believes that nervous disorders are not nearly so frequent an accompaniment as in ascarides, and that the only symptom of any value is the passage at stool, or during intervals, of fragments of the worms.

TÆNIA REMEDIES.

Shaw-Mackenzie ² _{Jan. 5} points out the danger attending the administration of raw-beef diet by citing the case of a child of 1 year and 7 months, subject to constipation, to whom was administered from 1 to 1½ ounces (31 to 46 grammes) of scraped or pounded raw beef on alternate days. Five months after this treatment proglottids of tape-worm (*Tænia mediocanellata*) were noticed in the faeces, and the worm removed by the use of male fern. Shaw-

Mackenzie states that, although for three years house-surgeon and registrar at the Victoria Hospital for Children, London, he had never before met with a case in children, but believes that it may be nevertheless common, and recommends that all pounded meat should be first scalded with a little boiling water or beef-tea, or, better yet, that a raw-chicken diet should be chosen, upon which he has found children to improve.

Treatment of taenia in children, although a difficult matter, has been followed by regular success when carried out according to the plan given by L. Duchesne. ²⁰² _{May 25} Take, for example, the case of a child 5 years old: 1. Abstinence from supper the evening before. 2. The following morning this preparation:—

R Ethereal extract of male fern,	4 grammes (1 drachm).
Calomel,	40 centigrammes (6 grains).
Sugar,	8 grammes (2 drachms).
Gelatin,	q. s.

Make into a jelly of ordinary consistency.

Children take this kind of electuary very readily.

Kaiser ³⁴¹ _{No. 27; Aug. 25} advises the use of—

R Croton-oil,	1 drop;
Chloroform,	2 cubic centimetres (32 grains);
Castor-oil,	20 cubic centimetres (5½ drachms);

for tape-worm in children, and sums up the advantages of the treatment as follows: 1. It renders preparatory treatment unnecessary. 2. The drugs are easily got and the dose easily prepared. 3. The medicine is not disagreeable to the taste and is of no great volume. 4. It is cheap. 5. There is no fear of bad after-effects. He asks his professional colleagues to try the medicine and to report on the results.

André Martin, of the French army, ²⁴ _{June 9}, after an extensive experience in the treatment of tape-worm among French soldiers, decides in favor of the ethereal extract of male fern, or perhaps kousso, as the most active and sure of all taeniafugal medication, and recommends the employment of antipyrin, syrup of ether (1 teaspoonful), or laudanum (8 to 10 drops), at the same time as the capsules of the extract. The use of these drugs is not to stupefy the worms, but to combat excessive peristalsis, which may cause a premature evacuation.

An editorial, ¹⁹ _{Oct. 10} under the caption "New Taenicides," refers to Areca nuts as follows: "Areca nuts are brought from India,

Ceylon, and the Philippine Islands. The *Areca Catechu*, of which they are the fruit, is a palm. Arecaleine is the active principle, and it is to this that the taenicide property is due. In its chemical composition and its properties, this alkaloid bears a marked resemblance to pelletierine, the active principle of pomegranate. Arecaleine is an oily volatile liquid, with alkaline reaction, soluble in alcohol, ether, chloroform, and water. With acids it forms soluble salts. Areca nuts are given in the form of powders; the dose is from 1 to $1\frac{1}{2}$ drachms (4 to 6 grammes). The alkaloid has not yet been administered with taenicial intent. The rules for the administration of Areca powders are much the same as those given for the administration of pomegranate-bark or pelletierine, arecaleine being a poison to the worm, numbing and paralyzing it for the time; the administration of the nuts must be followed by an active purge to remove the entire worm before it has time to recover from its stupor. It is well to precede the ingestion of the remedy by milk diet, and by a purgative or enema the evening before, that the intestines may be cleared of fecal matters, and that the drug may have a better chance of coming in contact with the worm. The helminth is generally expelled entire four or five hours after the ingestion of the remedy."

Ethereal extract of male fern seems to be, by all means, the favorite taenicide in the United States, notwithstanding the large amount of testimony as to its unpleasant if not dangerous effects. It is somewhat surprising, however, to note how large a share of the prescriptions recommended by correspondents of the medical press are of the shot-gun order; combining kamala, male fern, turpentine, pumpkin-seed, pomegranate-bark, ergot, and croton-oil. While these compound doses seem to be effective, the treatment is unquestionably empirical, and the physician is unable to give the truly active drug its due amount of credit. Taenicides are having a thorough overhauling by French physicians, who seem much more inclined to test each remedy separately, to discard those producing unpleasant or alarming symptoms, and to limit their prescriptions to such as give the greatest percentage of satisfactory results. The essential part of all treatment seems to be that the dose, which stupefies or kills the worm, should be followed quickly by a purgative, whether the taenifugal dose consists of a single drug or the entire therapeutic arsenal.

Colman¹²⁹ regards Burggraeve-Chanteaud granules of koussin as the remedy *par excellence* for the treatment of tape-worm. His experience has been a large one in those districts of Texas in which tape-worm is very common.

Boas⁶⁰ ¹⁰⁷ gives a concise review of new tænicides. After referring to a number of formulæ for the administration of male fern and pomegranate-bark, differing in no essential way from those familiar to the general practitioner, he speaks of the gradual disuse of kousso-flowers and the increasing employment of the active principle of kousso, manufactured by Merck and Bedall, under the name of koussin. Merck's preparation consists of small, odorless, yellow crystals, slightly soluble in water or alcohol, easily in ether and chloroform; it seems to be absolutely free from impurities. Bedall's koussin consists of a gray or yellowish-white, partially crystalline, bitter, irritating powder, rich in volatile fatty acids. It is soluble with difficulty in water, but easily in ether, alcohol, and caustic alkalies. It also contains amorphous by-products. Both preparations may be given in two or three doses in the form of gelatin capsules, compressed tablets, or in pills of 3 grammes (46 grains), at half-hour intervals. The discredit attached by practitioners to kamala (*glandulæ rattleræ* from *Rattlera tinctoria*, Roxl) he considers as due to the frequent adulteration of this drug with sand. Pure kamala should, according to Flückiger, give but from 3 to 5 per cent. ash, whereas many samples give over 50 per cent. ash. Anderson recommends as most agreeable the tincture of kamala, obtained by macerating 180 grammes (6 ounces) of kamala with 380 cubic centimetres (13 ounces) strong alcohol for forty-eight hours. To 4 cubic centimetres (1 drachm) of the filtered tincture add 16 cubic centimetres (4 drachms) of aromatic water (aq. flor. aur., menth. pip., etc.).

Of the newer tape-worm remedies he recommends, as most practical, tannate of pelletierine, an alkaloid prepared by Tanret from *Punica granatum*. The ordinary dose is from 0.5 to 1.5 cubic centimetres (8 to 25 minimis). Méplan praises this preparation, in doses of 0.06 cubic centimetre (1 grain), especially for children under 5 years. As a vehicle, he employs syr. mannæ.

Bennett⁵⁹ is quoted as prescribing chloroform (2 grammes—31 grains) in mucilage (60 grammes), to be taken in the morning and followed a half-hour later by 30 grammes (2 ounces) of castor-oil.

Bernhard Persh⁹⁸ is also quoted as recommending the following: Croton-oil, 1 drop; chloroform, 3 to 5 grammes; glycerin, 30 grammes; to be taken at one dose.

Naphthalin is referred to as recommended by a writer named Coriander, as being useful for both *tæniae* and *ascaridæ*. Children of from 1 to 2 years are to be given two doses daily of 0.15 to 2.00; adults, from 1.25 to 6.00 in powder. In the use of large doses attention should be given to the irritating effects on the bladder and the kidneys.

Myrtol, the aromatic oil of *Myrica cerifera*, is recommended in doses of 0.15 gramm (1/4 grain) three daily, in capsules.

The seeds of *Embelia ribes*, employed by the natives of the East Indies, is recommended to be given, as directed by Harris, in from 4- to 15- gramm (1 drachm to 1/2 ounce) doses, powdered, in sweet milk; this should be followed by castor-oil.

Thymol is recommended by Numa Gampi,⁶⁰⁴ whose method is to give large doses, e.g., 8 grammes (2 drachms) in twelve portions, preceded and followed by a dose of 20 cubic centimetres (5 drachms) of olive-oil. Boas warns against the danger of these large doses, but, as thymol is recommended as a specific for tape-worm by Gampi and by Vani, it seems worthy of trial.

In the discussion²¹ following the paper read by Duchesne before the Society of Practical Medicine, at the session held February 20th, Weber put forth the proposition that most *tænifuges* act as such through the astringency of the contained tannin. Areca nut, pomegranate-bark, etc., were given as examples. Other speakers, among them Dujardin-Beaumetz, opposed this view, arguing that tannin is neither a *tænicide* nor a *tænifuge*. The part played by tannin when given with mixed pelletierines is to render the latter insoluble, and thus to insure their passage through the stomach and into the intestines. It is necessary that pelletierine should come in contact with the parasites, as it is without effect when introduced hypodermically.

Duchenne,^{11 90} considering that the failure of anthelmintics may be due to the long interval often elapsing between the administration of the drug which paralyzes the worm and that which expels it, associates in the same capsule a *tænifuge* and a purgative—thus: ext. *filicis liquidum*, gr. vij (0.45 gramm); calomel, gr. ss (0.032 gramm); two capsules containing such ingredients

every two minutes until 16 have been taken. Seven grains (0.45 grammes) of antipyrin may be taken to quiet the intestines. Weber thinks the ethereal extract is an astringent and has not a sedative effect.

Escriba¹²⁹ speaks very highly of the following treatment: Several doses of Seidlitz-Chanteaud are given to prepare the way for koussin, three tubes of which are to be given at quarter-hour intervals. The worm is expelled in seven hours of the time of the first dose. He recommends following this treatment for a few days with Seidlitz-Chanteaud, and finally with a few doses of sub-nitrate of bismuth, administered at two-hour intervals.

A very satisfactory remedy is recommended⁶² for tape-worm, viz., drachm doses of oleoresin of male fern, accompanied by a drachm (4 grammes) of ether in simple elixir, an ounce (31 grammes) of Epsom salts having been taken the night before. Two hours after taking the male fern, 1 ounce (31 grammes) of castor-oil with 30 drops of turpentine should be administered.

Cocoa-nut as a remedy against tape-worm appeared in a number of journals, as it did last year, and is recommended as requiring no preparation before taking. The milk and flesh of one nut were found sufficient in each of 10 cases to remove the tape-worm entire. Bérenger-Féraud claims that he has met with success only once in 24 cases, while Parisi, of Athens, who introduced the remedy to the medical profession, states that he has always had satisfactory results.

J. O. de Man¹¹⁶ insists that the failure of extract of male fern as a taenicide is owing to the fact that too small doses are given. He has given as high as 450 grains (29 grammes) in capsules with satisfactory results. Out of 28 cases of perfect cure and no relapse, the treatment had to be repeated only in 3 on account of vomiting.

Bérenger-Féraud⁶⁷ reports on the cases of *tænia* in the maritime hospital of Toulon, for 1888. In 112 instances in which the head of the worm was examined all were of the unarmed variety, and only one was peculiar in being fenestrated. His observations as to the origin of the *tæniæ* go to show that there is a very sensible augmentation in the number of cases arising in France from year to year. Out of 108 cases in which the worms were completely expelled, the number of parasites in each indi-

vidual was as follows: In 87 cases, one single parasite; in 11 cases, 2; in 4 cases, 3; in 2 cases, 5; in 1 case, 6; in 2 cases, 8; and, finally, in 1 case, 10. These figures correspond with former observations cited in his work on "Taenia," showing that 1, 2, 3, and 4 parasites are frequently found, while from 5 to 10 are rare, and from 10 to 27 very exceptional. Féraud gives the exact length of the various worms and their weight in the different cases. He then instances a number of anomalies or varieties in which the proglottids were of enormous size and of a peculiar brown color; the latter he has termed *Taenia noir*. The patients treated had been afflicted with the parasites for from five months to eleven years.

Experiments as to medication went to show that the red pumpkin, *Cucurbita pepo* (Fr. "Giraumon"), has no taenifugal properties, while the yellow pumpkin, *Cucurbita maxima* (Fr. "Potiron"), gave successful results in the proportion of 20 to 100. He regards this remedy as unsatisfactory, ingestion being disagreeable and its use accompanied by greater *malaise* than in other taenifuges. His experiments with kamala gave the most unsatisfactory results; when used in all its forms, and in varying doses in 33 cases, it failed to bring away the head of the worm in a single case. In 152 cases pelletierine was employed successfully in 110, —a proportion of 72 to 100.

Waugh⁷⁶⁰_{May 18} is reported as showing a case of *taenia* in the clinic of the Medico-Chirurgical Hospital, in which the treatment had consisted of oleoresin of male fern, preceded by sulphate of magnesia and followed by an ounce (31 grammes) of castor-oil with 30 drops of oil of turpentine. His first attempt to remove the worm was unsuccessful; a second attempt, however, in which the patient was told to eat a cocoa-nut, in addition to the above treatment, brought away the worm entire. Waugh declines to attribute any virtue to the cocoa-nut, although the worm was not secured until its use.

Potain,¹⁷_{Jan. 27} in a clinical lecture at the Hôpital de la Charité on the treatment of *taenia*, points out the difficulty of diagnosing the presence of this parasite from symptoms alone, and the necessity of ascertaining the species before proceeding with the medication. Indications are presented in part by the digestive apparatus, in part by dyspnea, by diminution of the saliva, by a sensation of

constriction of the throat or chest in patients who are not nervous, and in pruritus of the nose and anus. None of these symptoms furnish constant or reliable means of diagnosis, which can only be made positive by the discovery of proglottids or eggs in the passages. Remedies are classed thus: 1. Metallic powders acting by traumatism upon the worm; powders of iron, of zinc, of tin, and of carbon. 2. Chemical poisons, under which he includes petroleum and nux vomica. He refers to observations by Peter on the possibility of employing cyanide of potash in this connection, citing the case of an American who took by mistake, in place of a sedative pill, one of the toy pastilles known as Pharaoh's serpents, which contained a certain amount of cyanide of potash. Although grave symptoms followed, the worm (taenia) was expelled. 3. Stupefiant, in which he includes carbonic acid, ether, and alcohol, it being known that parasites have been voided as a result of the consumption of large amounts of alcoholic liquors. 4. Specifics, the most of which give comparatively poor results, but among which are to be found the true remedies. Three of the principal specifics belong to exotic drugs, viz., musenna, a variety of acacia, found very useful in Africa, but much less so in France; kamala, a sort of red powder found in one of the Euphorbiaceæ of India (*Rottlera tinctoria*); and, finally, kousso, which for a time was almost the only medicine advocated in France. This is an Abyssinian tree (*Hagenia Abyssinica*, Wild—*Brayera anthelmintica*, Kunth) of which the flowers are employed in an infusion. Potain calls attention to the variability of the results obtained by the use of this drug as being possibly due to the fact that the activity of the stamine and pistillate flowers differs. Kousso is employed very largely in Abyssinia,—not for the purpose of displacing the parasite, but for provoking contractions of the intestines for relieving the habitual constipation of the natives. Indigenous specifics are likewise three in number: 1. The rhizome of the male fern, containing a volatile oil, and employed in the shape of a powder or an ethereal extract. This remedy was held as a secret in the seventeenth century, and was bought by Louis XIV for 10,000 livres. Potain points out the fact that certain regions furnish male fern which is inactive, as that of Normandy, while that procured in the Vosges is active. 2. Pumpkin-seed is the second indigenous specific, of which only the seeds of the common pumpkin are to

be employed, all others being inactive or poorly known. The useful portion seems to be the perisperm, which contains a greenish resin. Waugh⁷⁰⁰ refers to this also. Pumpkin-seed is the remedy, according to Potain, to be employed with infants and adults difficult to control. 3. The root of the pomegranate,—a remedy employed by the ancient Romans. The bark of the root is the only portion used, and is very active in the fresh condition. None of the species mentioned should be employed when over a year old, as they are almost invariably inert. The active principle of the root of pomegranate is pelletierine. This is a liquid alkaloid from which a solid sulphate can be made. The sulphate is, however, much less active. Pomegranate-bark gives rise to vertigo, palpitation, praecordial pain, nausea, vomiting, general feebleness, and cramps in the inferior extremities; sometimes permanent symptoms are produced, such as persistent paralysis of the intestinal muscles,—a condition requiring that a very energetic purgative be used soon after the administration of the pomegranate-bark. The use of this drug is often followed by obstinate constipation, owing to the inert condition in which it leaves the intestines. L. Duchesne⁸² coincides entirely with Potain in his remarks regarding the necessity of using fresh pomegranate-root.

Chloral hydrate is recommended by Rothe³⁸³ for the removal of tape-worm: 1 to $1\frac{1}{2}$ grammes (15 to 23 grains) in combination with 2 grammes (31 grains) of ethereal extract of male fern, and some rapidly-working purgative, *e.g.*, extr. colocynth and aloes, $\ddot{\text{a}}\ddot{\text{a}}$ 0.10 gramme ($1\frac{1}{2}$ grains); or 1 or 2 drops of eroton-oil or sapon. jalapin, 0.02 gramme ($\frac{1}{3}$ grain), in 4 gelatin capsules, which are to be taken in the morning within fifteen minutes after a cup of milk or coffee. He speaks very highly of this method as requiring only a very short time (three to four hours), and as being free from one of the usual inconveniences,—the production of intestinal pain.

At the meeting of the Société de Médecine et de Chirurgie de Bordeaux, held May 31st, ¹¹⁸ Vergely called attention to the case of a young woman whose death had been brought about directly by the administration of a taenicide. The patient, having passed segments of tape-worm, came to him for treatment, and was placed for forty-eight hours on milk diet. On the evening of the second day the patient was given 4 pearls of ether at intervals of five

minutes; the next morning 6 capsules of the ethereal extract of male fern with calomel were administered at quarter-hour intervals, followed by 30 grammes (1 ounce) of castor-oil. The patient was soon seized with acute abdominal pains and vomiting, which continued until next morning at 6, when death terminated her agony.

The autopsy demonstrated perforation of the stomach at a position corresponding to that of an old ulcer. A large tape-worm was found knotted up and dead in the anterior portion of the colon. In the discussion following the account of the case, Armaignac, Dudon, Saint-Philippe and Dubreuilh brought out the fact that serious symptoms following the administration of extract of male fern were not at all uncommon, and laid stress upon the necessity of eliminating the possible existence of a gastric ulcer before giving any of the irritating anthelmintics.

CYSTICERCUS.

In a paper read before the Pathological Society of London, H. B. Robinson² describes a case of *Cysticercus cellulosae* in the muscles of the back of a child 4 years of age. Upon dissection the cyst was found to be in the substance of the trapezius muscle. The parasite had been present for over four years.

Lancereaux,¹⁷ at the clinic of the Hôpital de la Pitié, presents the case of a young man of 22, having on the thorax and other parts of the body a great number of firm, indolent tumors about the size of small olives. These resembled the small ganglia of the post-cervical adenopathy of secondary syphilis. The patient reported had lived thirty-eight months in Tonkin under bad hygienic conditions, with a diet consisting largely of pork, and with very bad water. Many of his comrades passed fragments of tape-worms. A year after his return to France he was seized with giddiness and fell unconscious. These symptoms became frequent; he would become unconscious while at his meals, or drop his tools and fall while at work, without giving a cry. His comrades remarked that at these times his eyes would be convulsively turned up, and the next instant it would be all over. There was no biting of the tongue or frothing at the mouth, and the seizure lasted about ten minutes. For six months the symptoms continued and then stopped for several weeks. His sight was not affected. At this stage he perceived the presence of small tumors on the head and

forehead; these multiplied until they covered the entire thoracic region, but did not appear on the lower extremities. As all the symptoms pointed to cysticerci as the cause of the tumors, it was decided to open one of them. Upon lancing the tumor there escaped a clear, transparent liquid not coagulated by heat or nitric acid, and besides a membranous sac, which was found to contain the double crown of hooks of the cysticerci. Lancereaux proceeds to give a *résumé* of the varying apoplectiform or epileptiform symptoms due to the presence of cysticerci in the brain, and refers to accounts by the following authors: Hirt, of Breslau,⁴ who reports symptoms of tabes dorsalis in cases where cysticerci became lodged in the cord; Nivet,³⁶⁰ _{v.3,p.478} delirium and intermittent attacks of epilepsy; Kohler,³⁶¹ _{v.2,p.218} cysticercus in the brain of an idiotic woman, dead of Bright's disease; Bernard,⁹⁴ _{v.5,p.218} cysticerci of the brain, producing violent frontal cephalalgia, abundant vomiting, vertigo, epileptoid attacks, and a narrowing of the field of vision; Aran,³⁶⁰ _{v.4} out of 47 cases, notes in 7 the existence of convulsions, and in 6 hemiplegia; vision was affected or lost in 6 instances, general sensibility was diminished in 3. hearing lost in 2, *tournoiement*, or *tournis* (staggers), in 3 cases. Clémenceaux¹²¹⁴ cites a case where nine cysticerci existed in the outer portion of the motor tract, without producing a single symptom during life. Frédet¹⁷ presents one of the exceptional cases in which the parasites reveal their existence through the sudden death of the patient; Harrington,⁶ _{v.6} a case in which over twelve years were required for the development of the pathological conditions. The course of the symptoms was as follows: Enfeeblement of memory, obtusion of the intellectual faculties, with embarrassment of speech, acute mania, dementia, then sudden convulsive attacks followed by hemiplegia of the right side, and later by contracture; at times vomiting, manifestly of cerebral origin. In the last three years, epileptic attack and paralysis of the left side. Aphasia became complete, and the patient died in coma. These facts give an idea of the progress of the symptoms in cases of encephalic cysticerci, their intermittence at the beginning and their continuity later on, and, finally, the total absence of all febrile reaction. Lancereaux can suggest no treatment in cases of cysticerci of the brain, and although patients do recover, as many, on the other hand, die. He then goes on to distinguish between *cysticercus* and *echinococcus* of the nerve-centres, the

nervous symptoms being much more striking from the outset in cases of hydatids, and the course of the symptoms up to coma and death more uniform and rapid.

NEMATODES (THREAD-WORMS).

The discovery by J. Schirmer²⁰⁹ that annatto-paste is very commonly found to contain nematode worms is of interest from the large use made of this drug (*Bixa orellana*) for coloring butter and cheese, and to give to skimmed and watered milk the appearance of rich, whole milk. The finding of these worms, and the fact that annatto is frequently moistened with urine by the native collector to prevent its drying, is sufficient to lead physicians to decry its further use, or, at least, to insist that it shall be exposed to a temperature sufficient to kill the worms before employing it as a coloring agent for food-stuffs.

STRONGYLUS.

A. Silvestrini³²⁷; ¹_{May 18} reports several cases of false rabies due to the dogs being infested by *Strongylus gigas*. Among the symptoms is a disposition to bite; the animal avoids the light, its mouth is red and frothing, its voice is hoarse, and its gait is vacillating. Its expression is that of suffering rather than ferocity. The condition is somewhat difficult to distinguish from rabies, but the occurrence of haematuria, from the lodgment of the parasite in the urinary passages, establishes the diagnosis. The disease is fatal except in the rare cases in which the worm is expelled by the urethra. In all cases of bites from dogs supposed to be mad, a careful search should be made for this parasite.

Beck, of Meissen Grossenhain,¹²³ places on record a case in which complete relief from severe symptoms of haematuria, extending over a period of eight weeks, was experienced upon the passage from the urethra of a specimen.

ASCARIS.

Coppola³⁰² calls attention to the advantage of santoninoxim over santonin. He ascribes the symptoms of intoxication following at times the administration of santonin to the presence of an unusual amount of lactic acid in the intestines, as a result of the catarrhal condition due to the presence of parasites; this favors the solution

of the santonin and its consequent absorption. He therefore recommends the use of santoninoxim in double or triple doses, as equally active, non-toxic, and less absorbable. It is a crystallizable body obtained by Cannizaro, after subjecting santonin in an alkaline solution to the action of hydroxylamine.

At the Société des Sciences Médicales de Lyon,²¹¹ Poncelet referred to the discovery of a living *ascaris* in the peritoneal cavity in a case of laparotomy performed for peritonitis. The propriety of making a histological examination of the intestine at the point of perforation, in all cases of death following perforation, was suggested by H. Coutagne, from a medico-legal stand-point, for the purpose of eliminating the possibility of unnatural causes of death by ascertaining approximately the age of the perforation.

Another case of perforation of the small intestine by a round worm is given by Fitzmaurice.¹⁶ The muscular structure and the mucous membrane of the intestine presented a contused, bloody sulcus for about $1\frac{1}{2}$ inches (38 millimetres) from the point of perforation, where the worm had evidently been embedded for a long time.

An interesting case of spasmodic laryngitis of reflex origin, provoked by *Ascaris lumbricoides*, was presented by Muselli¹⁸⁸ at the Société de Médecine et de Chirurgie de Bordeaux, December 7, 1888. The patient was a child $4\frac{1}{2}$ years of age, and presented all the symptoms of diphtheritic laryngitis, except the presence of a false membrane. As a result of the administration of an emetic the child vomited a bunch of four or five worms. The immediate cessation of all the symptoms and the disappearance of the swelling in the tonsils indicated the reflex origin of the disease, and the necessity for the avoidance of undue haste in the performance of tracheotomy in cases presenting no general premonitory symptoms.

Estebano Borrero Echeverria¹⁴⁵ reports a fatal case of ascaridiasis in an inhabitant of Havana.

OXYURIS.

Gubb²⁵ recommends rectal injections of cod-liver oil or an emulsion of it with eggs, as a reliable and non-irritating treatment for *Oxyuris vermicularis*.

A. Grimaud, of Barèges,³⁵ confirms the statements of Lallemand (de Montpellier), as to the use of natural sulphur-water in the

treatment of cases of oxyuris. He obtained the most satisfactory results, the worms disappearing completely and not recurring for many months, if at all. The sulphur-water is to be taken internally or per clysm. Grimaud is convinced that this treatment will be found of equal value for other intestinal worms.

George J. Monroe, of Louisville, Ky.,¹⁹⁹ recommends the use of injections of turpentine, diluted with some bland substance, in the treatment of pin-worms.

TRICOCEPHALUS (WHIP-WORM).

James B. Hogg, of Goodna,²⁰⁷ Dec., '85 maintains, in a paper read before the Medical Society of Queensland, that the importance of *Tricocephalus dispar* as a human parasite is not sufficiently appreciated. He strengthens his position by describing 4 fatal cases in which vast numbers of these worms were found in the intestine upon post-mortem examination. In reference to the treatment to be adopted in cases of these parasites, he finds that injections of tincture of catechu seem to bring them away, while santonine or injections of turpentine have no effect.

TRICHINOSIS.

Nonne and Höpfner¹¹⁴ B.15.H.5,6 give a detailed account of their clinical and anatomical investigations regarding the pathology of trichinosis. Their studies were carried on during the epidemic of the summer of 1887 in Hamburg. Albuminuria was determined to be present in 17 per cent. of the cases. In about 60 per cent. there was a failure of the triceps and patella reflex,—a condition lasting a longer or shorter time, and either affecting both extremities or being one-sided. The skin reflexes remain normal. Anomalous conditions of nervous excitability were found to exist in many cases.

Paul Gibier, in a note presented to the Académie des Sciences by Louis Pasteur,³ 1882 describes the results of some experiments undertaken by himself upon the vitality of trichinæ. He first refers to experiments made in 1882, in conjunction with Bouley, upon the resistance to the action of cold of trichinæ contained in American hams salted with a mixture of common salt and saltpetre. The more-recent series of experiments were conducted entirely with the trichinæ contained in fresh meats. Gibier

found that the parasites would stand an exposure of two hours to a temperature of 25° F. (-3.9° C.) below zero without affecting in any way their activity.

W. Makeig Jones, ^{Sept. 21} in a paper read before the Yorkshire branch of the British Medical Association in Sheffield, records a case of trichinosis due to eating American hams. The symptoms noted differ from those found in the majority of cases by Nonne and Höpfner ¹¹⁴ _{B.M.J., 1856} in that knee-jerk and ankle-clonus were exaggerated.

Trichinosis is reported ²² _{Mar. 6} as having been very prevalent in Dantzig since December, 1888.

Vincente Ferrery Genoves ⁷⁰⁷ _{Feb. 2; Mar. 9} ² is quoted as reporting several cases of trichinosis that have recently occurred in the town of Albaida (Valencia, Spain), a place of about 3500 inhabitants. Out of 30 cases 12 had resulted fatally.

Dawson F. D. Turner ⁶ _{Mar. 30; May 11} places on record the longest period yet noted in which encapsulated trichinæ have been observed to retain life, and to be capable, under suitable circumstances, of active propagation. At a post-mortem examination, held at the Vienna General Hospital, upon a man who died of carcinoma of the œsophagus, it was found that his muscles were studded with innumerable white calcareous nodules, which, upon microscopic examination, turned out to be encapsulated trichinæ. With the single exception of the heart, all the muscles seemed to be pretty equally affected. This condition had been quite unsuspected, but it was found, upon consulting the patient's previous history, that twenty-six years before he had suffered from a very severe attack of muscular rheumatism. As the trichinæ seemed to be in an excellent state of preservation, some rabbits were fed upon the diseased tissue, with the result that after three weeks trichinæ were found in numbers in their muscles and intestines. The longest previously-recorded case was one of thirteen years, observed by Virchow after the Hamburg epidemic.

ANCHYLOSTOMUM.

John D. Macdonald, of the Medical College of Ceylon, ¹⁷⁴ _{Nov., '88} contributes a translation of Eichhorst's (Zurich) valuable summary of the accepted European teachings respecting *anchylostomiasis*. This peculiar form of anaemia (due to the presence of an intestinal parasite, and differing in no respect from pernicious anaemia,

except in its curability) is prevalent not only in India, China, Japan, and Ceylon, but also in South America and Europe.

In a prefatory note Macdonald calls attention to the valuable service that has been rendered by Kynsey¹²¹⁸ in his "Report on the Anæmia or Beriberi of Ceylon." According to Macdonald's personal experience, the most efficient remedy to be used against the parasites is thymol. He has never found it to have any irritant effect whatever on the intestines; it is not followed by either vomiting or diarrhea, and, being very insoluble in ordinary media, it has merely a local effect on the parasites. Thymol is given on an empty stomach in the early morning, and the ova, as a rule, disappear completely from the faeces after the first two doses, the patient making an astonishing recovery immediately afterward when put on iron.

James B. Hogg, Assistant Medical Superintendent, Woogaroo Lunatic Asylum, Goodna, Queensland, ²⁶⁷ Feb. is the first to put on record a fatal case of anæmia due to the *Anchylostomum duodenale* as occurring in Australia. The patient, a lunatic, was in the habit of swallowing stones and other foreign bodies, and was very dirty in his habits, circumstances which Hogg very properly suggests should lead to an inquiry into the prevalence of the disease among geophagous races.

Surgeon-Major Oswald Baker, of Moulmein, India, ²⁰⁶ Dec. 1888 calls attention to the wide prevalence of *Anchylostomum duodenale* and its connection with jail debility. He states that he has seldom failed to find the ova of this parasite in all cases of anæmia, both slight and profound, for the production of which there was not some other obvious explanation, in the cases coming under his observation in Moulmein. After going on to record the history of several cases, he concludes by announcing that he has found the ova of anchylostomum in the evacuations of the dog. Lutz has recorded its occurrence in the gibbon; otherwise its existence outside the human race was up to this time unknown.

PSEUDO-PARASITES, LARVÆ OF DIPTERA, ETC.

Hugo Summa¹⁰⁹ _{Notes 4, 5, 6} contributes three valuable articles on the pseudo-parasitism of diptera in man. The first article is an interesting general review of the subject, including a list of the species of diptera that have been recorded as producing myosis

and a bibliography of the various cases: Hope, ¹²¹⁹ Koch, ⁸¹⁶ Tieudemann, ¹²²⁰ Grube, ¹²²¹ Loew, ⁸¹ Wohlfahrt, ¹²²² Froriep, ¹²²³ Voigt, ⁸¹⁴ Troschel, ⁸¹⁵ Thienemann, ¹²²⁴ F. L. James, ¹⁰⁹ Salzmann, ¹³³ Ule-Wagner, ¹²²⁵ Meschede, ²⁰ Gerhard, ³²⁸ Tossato, ⁶⁰¹ Bateman, ³⁶ Jenyns, ¹²¹⁹ Wacker, ⁸⁴⁷ _{No. 11, 188}

The second article, besides two interesting cases of myiosis narium, due to the presence of the larvae of *Muscæ vomitoriae* (blue-bottle fly) and *Sarcophagia carnaria* (common flesh-fly), gives his conclusions regarding the causation of the various forms of myiosis as follows: 1. Myiosis vulnerum, narium, aurium, or conjunctivæ, is always caused by different species of the Sarcophagineæ and Muscidæ, both genera being sometimes comprised under the term Creophila—flesh-flies (perhaps of the Oestridæ also, which generally prefer cattle, horses, sheep, and the like). 2. Myiosis intestinalis is always caused by various species of the genus Anthomyidæ. 3. The cause of this strange distribution is based on a biological fact. Whilst the members of the Sarcophagineæ and Muscidæ, which “lay their larvæ upon every animal structure of nutritive material derived from the animal kingdom, subject to the laws of decomposition,” directly invade natural cavities of the human body with badly-smelling discharges, the different species of Anthomyidæ only indirectly enter the human body; that is, pass into the digestive canal by means of spoiled food..

In the third article Summa sketches the clinical history of myiosis: 1. Myiosis vulnerum (fly disease of wounds), the so-called living wounds. A wound becomes a living wound provided that it is accessible to the female flies of the genus Creophila (Sarcophagineæ and Muscidæ). A second condition is that the wounds have been badly managed, putrid, septic. It is worth knowing that even the short time occupied in dressing is sufficient to enable the fly to deposit her brood in it if particular care be not taken. All forms of myiosis occur only in summer and autumn, in temperate climates as well as in hot. To the naked eye such wounds appear as if beset with headless nails, which rise and fall with the extension and contraction of the animals whilst sucking. When the position of the larvæ is superficial, we distinctly see their white bodies, which are 2" in thickness; the head sits with its hooklets in the bottom of the wound, which usually secretes no pus, but only a bloody, watery fluid, and has a bluish-pale and, after the

removal of the animals, a spongy appearance. The black hinder parts and the respiratory orifices are directed outward.¹²²⁶ The best treatment is to remove the larvæ mechanically with the forceps. It is sometimes pretty difficult to seize them; if not grasped firmly they rapidly creep back. Pruner-Bey, who observed a great many cases of myiosis vulnerum in Egypt, tried milk, but without success. Kuechenmeister recommends a weak infusion of tobacco. After the removal of the larvæ the cavities which they have made and the excrescences in their neighborhood soon heal. 2. Myiosis narium, conjunctivæ, etc. In these cases also an invasion of various species of the genus *Creophilus* into the natural cavities of the human body causes the disease. But here, too, it is to be mentioned that the natural cavities must be diseased in some way before the invasion takes place. This is a leading feature in all reports on myiosis, narium, conjunctivæ, etc. The most common larvæ to be found in these cases are those of the common flesh-fly (*Sarcophaga carnaria*) and of the blue-bottle meat-fly (*Musca vomitoria*). The symptoms, which are in most cases of a very serious nature, are caused partly by the local affection which the larvæ produce, partly by reflex action. In the first days of the disease only local symptoms appear. In myiosis narium the internal and external parts of the nose begin to swell and become red. These and general symptoms, as fever and great loss of strength, in a superficial examination may lead to the erroneous diagnosis of erysipelas. Reflex symptoms set in very rapidly, sometimes of the greatest danger, which may even lead to death. Intolerable headache, insomnia, convulsions, and coma have been observed in nearly half the cases reported. If the diseases have been diagnosed early enough, even very serious symptoms may quickly disappear after the treatment has satisfied the indicatio causalis, viz, after the removal of the larvæ.

Finlayson²¹³ presented to the Glasgow Pathological and Clinical Society several specimens of the flower-fly, *Anthomyia canicularis* or *scaluris*, passed alive in swarms from the bowels of a male patient; and also an interesting account of the case, in which the ova seem not to have been swallowed, but to have been deposited at the anus while the patient's bowels were being moved at a privy, and taken up within the bowel after the process of defecation was finished. Finlayson's account is accompanied by

useful references to the literature bearing on the pseudo-parasitism of the larvæ of dipterous insects. It is important in all cases of myiosis, owing to the difficulty of identifying the species from the larvæ alone, that the adult flies should be reared by placing some of the larvæ in a box or jar having a perforated lid, and feeding them with raw meat or decaying vegetable materials. The following references are quoted, as they are not included in the list given by Summa: White¹²²⁷: "Case of a patient who discharged the pupæ of *Musca ciliaria*;" Westwood⁸⁴⁹: "Occurrence of the larvæ of *Anthomyia scalaris* in man;" Rev. J. F. Hope⁸⁴⁸: "Dipteral larvæ producing myiosis;" Pickels¹²²⁸: "Case of a young woman who has discharged and continues to discharge from the stomach a number of insects in different stages of their existence" (chiefly larvæ of coleopterous insects); Samuel Crumpe¹²²⁹: "Larvæ (*Anthomyia*?) which were voided *per anum* (hominis)." ¹²³⁰

Langstein⁸⁸ _{Dec. 19, 1889} reports a case in which, by catheterization, he removed from the bladder of a woman recently confined a large number of larvæ of the common blue-bottle fly, *Musca vomitoria*.

Finlayson's article²¹³ _{Mar.} calls out several notices of cases of pseudo-parasitism, and the bibliography of the subject is added to somewhat by the editor of the *British Medical Journal*. ² _{June 8} James A. Calder, of Jamaica, ² _{Aug. 3} places on record a case occurring in his practice, as does Norris F. Davey, of Abergavenny. ² _{Aug. 3}

Charles Bevill, of Winfield, Ark., describes 2 cases of pseudo-parasitism which he has met with in his practice, one in which larvæ of the common blue-bottle fly were vomited by a boy after severe gastric symptoms and convulsions. The second case was one of otorrhœa in a child 7 months old, produced by the presence of fly-larvæ.

Raphael Blanchard¹⁵² _{Sept. 21} is quoted from the "Dictionnaire encyclopédique," in his citations of a series of examples of the curious errors that have at different times been made in regard to the nature of certain residents of the intestinal tract.

A case of myiosis, due to the presence in the intestines of the larvæ of *Homolomyia* sp., is recorded by Daniel Fischer. ¹⁵³ _{Mar. 20} Another case is described by Alex. J. Fleming, ² _{June 22} the larvæ being those of *Anthomyia canicularis*. A case of *Hypoderma* larva in the brain of a horse and several articles concerning the occurrence of this parasite are referred to. ¹²³¹ _{p. 13}

DISEASES OF THE KIDNEYS, BLADDER, AND SUPRA-RENAL CAPSULES.

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AND

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DISEASES OF THE KIDNEYS.

PHYSIOLOGY OF THE KIDNEYS.

As the result of careful comparative measurement of eight normal kidneys from different ages (1 day to 48 years) and counting their constituents, Eckard ²⁰_{V.14, No. 2; Aug. 31} ⁶¹ states that, with the cessation of embryonic growth, new glomeruli no longer develop, but in the growth of the kidney the glomeruli increase in size. The convoluted tubules grow both in length and in thickness during the early years of life. After these first few years they grow in length, either through hyperplasia or simple hypertrophy of their epithelium. The writer has examined in the same way kidneys in hypertrophy compensating either for congenital or acquired defect. In the former case the compensating hypertrophy consists of a true hyperplasia of the glomeruli and other elements as well as a hypertrophy of those already existing; in the latter case the increase in size depends upon increase in size of the elements of the kidney.

Lorenz ¹¹⁴_{B.15, H.5, 6} has been enabled, by the special staining method with indulin employed by him, to establish the presence of a ciliated border of the tubular cells of the normal kidney in man (especially in the embryo), dogs, cats, puppies, guinea-pigs, cattle, hogs, frogs, lizards, and carp. He regards this ciliated border as in some way connected with secretion, and looks upon it in a certain measure as protective to the epithelium. In case of swelling of the cells to any degree, this border is lost and does not appear again. With these observations in view, he comes to the conclusion that the primary seat of the acute cases of nephritis is not, as a number of recent writers would have, in the interstitial

net-work, but in the epithelium itself. Housemann, ³¹⁹ _{May 4} commenting upon this paper, announces that he has demonstrated the ciliary border in monkeys, horses, sheep, deer, and bats. He does not accept the idea that there is any relation between the ciliary arrangement and secretion, since in many kidneys which performed their function normally it was no longer present; nor does he regard the ciliae as in any light protective to the epithelium. Grehant, ¹⁶¹ _{Mar. 7} by carefully estimating the amount of urea excreted in a given volume of urine and the amount in a like quantity of blood from the same animal, demonstrates the fallacy of the idea of certain authorities that the secretion of urine is almost entirely, if not entirely, a simple filtration (osmosis). His results show that the urine contains several hundred times as much urea as a like volume of blood (his highest result being 444 times more than in the blood), a proportion entirely unlikely to be due to osmotic processes. The same position is taken by Adami ¹⁵ _{Apr.} in regard to the view of Grainger Stewart that the glomerular functions are essentially those of membranes permitting transudation. The fact that all transudations contain albumens, while normal urine is free, or practically free, of such substances, is proof in point that they possess further function, in view of the proven properties of the tubular epithelium as secretive rather than absorbing elements. A further suggestion as to the selective power of the glomerules is the fact that they are covered with epithelium which in no special particular differs from the tubular cells.

BRIGHT'S DISEASE.

Etiology.—An interesting series of cases of albuminuria in several generations of the same family, in most of whom, at least, true renal change was manifest, is mentioned by Dickinson. (See *Albuminuria*, K-11, vol. iv.) As to the influence of alcohol in the production of renal disease, the report of the British Investigating Committee upon Alcoholism states that there is little connection, and that general opinion agrees that chronic alcoholism is but a slight causative factor in such cases. Beevor, ² _{Feb. 2} however, going over the records of 100 cases admitted to hospital under George Johnson, concludes that there is considerably more influence exerted upon the kidneys by alcoholism than would be inferred from the above report. Among the men included in these 100 cases (over 25 years of age) he found 50 per cent. addicted to habitual

and free drinking. Cases produced by the ingestion of cantharides (Fabre⁵⁵_{Nov. 10}), carbolic acid (Finley²⁸²_{Aug.}), and the experimental administration of boracic acid (Plaut¹²¹⁷) are recorded. The changes produced by the last two substances are practically identical, consisting of acute parenchymatous inflammation, cellular exudation into Bowman's capsule, cloudy swelling of the tubular cells, diffuse haemorrhage, slight fatty degeneration, and cast formation.

The question of a microbic origin of renal inflammation has assumed considerable proportions. Rattoni³_{Oct. 23} states that in his view nephritis is not always due to a primitive renal lesion, but to the passage through the kidney of substances acting as toxic agents, and that, at least in the acute form, these substances are products of microbic activity. The same position is taken by Maragliano,⁵⁸⁹_{Oct. 30} reported by corresponding editor Meyer, in relation to nephritis in cases of acute pneumonia. That the renal disease is of microbic origin the writer looks upon as more than probable, not from direct action of the pneumonia diplococcus, but from the irritation of some toxic substance, the product of the pneumoococcus, which is excreted by the kidneys. Ribbert,⁶⁹_{Sept. 26} while he acknowledges that the acute catarrhal processes may be due to the excretion of microbic products, and the more chronic processes may also be in relation to the same processes, regards the interstitial changes as primarily (in most cases, at least) caused by the actual presence in the renal structure of micro-organisms. Albaran,²⁰⁶_{Oct.} in his studies of renal bacteriology, recognizes the power of the kidneys to eliminate micro-organisms, and in this process states that in cases of intense infection they produce a congestion and sometimes haemorrhage; if their elimination is a more-gradual one, a diffuse nephritis is apt to result, with preponderance of haemorrhagic and catarrhal symptoms; if the elimination is very prolonged it is apt to produce a suppurative nephritis due to septic embolism. Lafitte,¹²⁶_{Oct.} in a recent thesis upon the pathogenesis and nature of Bright's disease, argues for a microbic origin. The sudden angina in many beginning cases of Bright's disease is suggested as evidence of this occurring, as it does, in a number of the infectious diseases. He adduces the discovery by M. Beam of a bacillus in the urine of albuminuric and eclamptic women which produces in animals convulsions and a diffuse acute inflammation. Whatever the irritant substance, the author regards its operations as not limited

to the kidneys, the organs generally being probably influenced by it. As in most infectious diseases there occurs a diffuse nephritis, myocarditis, hepatitis, nervous disorders,—all independent of each other and produced directly by the toxic substance caused by the bacteria,—the author concludes sufficient similarity to class acute diffuse nephritis as an infectious disease. The chronic varieties the author does not recognize as a sequel of the acute, but refers them to the operation of some different form of micro-organisms. The argument in the author's thesis is ingenious; but it is entirely by analogy, not by actual demonstration, and therefore lacks the importance it otherwise would possess. Stefania⁷⁶⁸_{84, p. 33} has had the opportunity to observe a peculiar epidemic occurring in children, the acute symptoms of which were of four or five days' duration, marked by intense fever. Following this febrile condition, a period in which occurred albuminuria and œdema, lasting ten or more days, was observed; after which, if the patient did not in the meantime die, complete recovery took place. Three children came to section, in the first of which the renal capillaries, the Malpighian tufts, and here and there the tubules presented masses of cocci. These occurred in masses, singly, in pairs, or in greater numbers. The tubular epithelium was considerably altered, and the interstitial substance showed numerous proliferative evidences. The other two children did not show the presence of micro-organisms in the renal system, but there were the evidences of the same proliferative and degenerative processes in the interstitial substance and parenchymatous elements of the kidneys of each. The author believes that the nephritic changes in these cases were undoubtedly due to the elimination of the micro-organisms by the kidneys, the second and third of these cases, dead upon the tenth and fifteenth day, respectively, having probably more completely accomplished this process than the first, dead upon the fourth day. A case of acute nephritis, associated with suppurative phlebitis of the portal vein in the liver, with ulceration of the large intestine, is reported by Dalton.⁶_{Feb. 16} In this case it is the writer's view that the ulceration of the intestine, of a dysenteric nature, was the primary seat of a pyæmic process manifesting itself in the liver and kidney. The kidney was not markedly septic, the inflammation being perhaps caused by the elimination of certain noxious principles thrown out by the diseased liver. Cases of scar-

latinal nephritis are mentioned by Snyers,²⁹³ Hagenbach,³⁹² Hoffmann,⁵⁰⁵ Sörensen,¹¹³ Ekkert,⁵⁵ Tresilian,¹⁰⁴ and others. From a clinical point of view the observations of Hagenbach are important. Out of 81 autopsies of scarlatina at the Basle Hospital nephritis was found 55 times; and, in regard to the origin of this form of renal disease, the writer suggests from his observations that a family predisposition may often be detected. According to this writer, nephritis is less rare after diphtheria,—out of 150 autopsies of cases dead of diphtheria 52 cases of nephritis being established. It is rare in measles, varicella, and rubella; so, too, in catarrhal angina, in parotitis and aphthous stomatitis. The occurrence of but 8 cases of renal involvement in 300 cases of typhoid fever, and the establishment of but 3 cases in 24 post-mortem examinations, marks the occurrence of nephritis in this disease as rare.

Mircoli⁵⁰⁵ pointed out some time since that renal complications may occur not rarely in whooping-cough. On one occasion, out of 10 cases of this disease, 2 gave evidence of nephritis, 1 dying. Again, out of 35, 4 developed renal inflammation, of whom 2 died—1 at section presenting the usual lesions of parenchymatous nephritis, but no micro-organisms. Recently, in an epidemic at Montenebliano, of 24 cases, 3 died—1 from renal complication, a second from a paroxysm of cough, and the third from marasmus. In these last two there were no symptoms of renal trouble during life, but on section the kidneys were found very congested, and showed numerous haemorrhagic infiltrations. In neither case was the writer able to demonstrate the presence of micro-organisms. Mircoli believes that in these cases the renal disease is not so much due to bacteritic infection as to stasis in the vena cava from coughing, and states that 12 per cent. of cases of pertussis have renal involvement. Von Jaksch,¹¹³ in comparing the albuminuria of febrile origin in children with that of adults, places the ratio as 35.2 for children to 19.6 for adults. In children, this writer states that, although the acute primary nephritis is by far the most common, the chronic forms, as the fatty and contracted kidney and amyloid disease, are by no means unusual. Fiesinger⁵⁵ states that in cases of epidemic influenza there may be manifested considerable renal involvement, just as in any other microbial fever. Several clear-cut groups of renal invasion may be separated—a slight glomerulo-nephritis with transient albuminuria,

an acute haemorrhagic nephritis without oedema, and an acute nephritis with more or less manifestation of this last symptom.

Cases of nephritis occurring in pregnancy are mentioned by Pennington, ¹⁰⁴ June 29 Atkinson, ¹⁰¹ June 29 and Jaccoud, ²⁴ Mar. 31. All of the cases mentioned by the first two developed during the latter portion of pregnancy, from the fifth or sixth month on, prior evidences of the presence of nephritis not being noted. Jaccoud's case first manifested itself in the early part of her first pregnancy, two years previously, and was peculiar in that the albuminuria persisted in a marked degree even when all the phenomena of severe accesses of uræmia were absent, and throughout a prolonged and strict milk diet, the amount being estimated as 3.5 grammes (54 grains) per 1000 cubic centimetres (2 pints). In a clinic, Lecorché ²⁰² Oct. 25 presented 3 cases of women in whom evidences of Bright's disease appeared during their first pregnancies, using them as text for stating his belief that pregnancy is never primarily the cause of Bright's disease. In none of these cases, however, did the lecturer more than probably prove the presence of prior nephritic changes, of which he regarded each case as a simple aggravation. Although in each case the manifestations appeared late in the pregnancy, the observer does not consider as an etiological factor the element of pressure from the gravid uterus. This question of the pressure upon the kidneys or other portions of the urinary tract by enlargements of the neighboring organs is well illustrated by two specimens exhibited by Crooke. ² Apr. 20 In the first case, a young woman, a cyst of the broad ligament had compressed the right ureter. At the autopsy the kidney was found atrophied and granular, the capsule thickened and adherent. There was no thickening of the arteries, but some of the tubes were well dilated and filled by a coagulated exudation mass, and showed pressure atrophy of their epithelial lining. An interesting point was the absence of dilatation of the ureter. This the writer attributed to the fact that pressure was only marked while the tumor was within the pelvic walls; when it had emerged above the pelvis the pressure decreased, and any dilatation that had existed disappeared. In the second case, in a young man, the hilus of the kidney was invaded by a chondrosarcomatous growth pressing both upon the vessels of the kidney and upon the ureter. The kidney was atrophied, the vessel-walls thick, and the capsule fibrosed.

Engelmann¹ assumes a similar position as to the importance of pelvic disease in the production of renal changes through pressure upon the ureter or kidney or through the induction of some nervous perversion.

Symptomatology.—Knight⁷⁶⁰ calls attention to the frequency of latent Bright's disease,—latent at least so far as urinary symptoms are concerned,—and details several cases in whose urine albumen or casts had never, in numerous examinations, been demonstrated, and in whom the first evidence pointing to renal disease was the occurrence of persistent and uncontrollable vomiting, without any symptoms of organic gastric disturbance. Brayton⁵⁶ urges the same view as to the value of these symptoms, albuminuria and the presence of casts, regarding them as neither absolutely constant in Bright's disease nor as invariably due to nephritic cause when present. Sehrwald,³⁴ Nov. 21, 1881; Dec. 4, 1882 in an elaborate article upon the relation of the albumen lost in nephritis to that taken into the system, formulates the following conclusions: The amount of watery excretion through the kidneys, except in the most-general way, bears no relation in amount to the water taken into the body, but depends on other considerations quite as much as this. The more secretory work demanded of the epithelium of the glomerules, the more likely is it to allow the transudation of albumen, and the more nearly does it act as a dead membrane in regard to albumen excretion. Even more injuriously than excessive activity does poor nutrition influence the epithelium, and, as a consequence of insufficient albuminous supply to these elements, the albuminous loss increases. The loss of albumen runs parallel with the amount of water and salt excreted, but is entirely independent of urea. Temperature increases albuminous waste only as it increases tissue-change.

Bond⁴⁴ calls attention to the value of a prolonged lowered excretion of urea as an early symptom in chronic renal disease, preceding by months or years the appearance of albumen and casts in the urine. Jones¹⁵ has made a number of observations upon the density of the blood in acute and chronic parenchymatous and chronic interstitial nephritis. In the first the specific gravity was variable, either normal or below normal; in the second it was almost invariably diminished. In chronic interstitial nephritis, in the cases accompanied by gout, the rule was for the specific

gravity to be below the normal (about 1051); in those in which gout did not occur, above normal (about 1058). Among the latter it was pointed out that in those dying from cerebral haemorrhage the specific gravity was the highest (about 1060), and that the coincidence of such density with a case of interstitial nephritis is a prognostic point as to the liability of the patient to cerebral apoplexy. Jones suggests, in explanation of the tense pulse in acute renal disease, the non-excretion of watery elements, causing an increase in the blood-volume; and, further, that such an increase in volume may occur in the early stages of the granular kidney, and contribute to the cardiac hypertrophy and vascular changes, which later on are sufficient to account for the increase in blood-tension. Seeking to explain the phenomena of renal dropsy, Auld ⁶ _{Sept. 14} follows this line of reasoning. Renal dropsy has usually been referred to a hydæmic condition of the blood, without special reference to other alterations of the constituents. The simple increase of watery material does not, however, experimentally suffice to produce any œdema. From the clinical connection of the symptom with a decrease in the red globules, it is probable that this must be regarded as a factor in the production of it, and the combination of such an oligocythaæmia with a hydæmic plethora at least largely completes the proper conditions for its appearance. The mutual actions of the corpuscles of the blood in health in assisting in the proper propulsion of the blood-stream being lost, the hydæmia further, by alteration of the relative specific gravities of the hæmic elements, signally impairs the circulatory function. The corpuscles, not maintaining their normal relations in the current, serve rather to impede its rapidity and thus increase the blood-pressure, causing a greater escape of fluid from the vessels than usual. Further, an alteration of the specific gravity of the blood as a whole, in relation to that of the fluid in the surrounding lymph-canals, augments this tendency to extravasation. This is especially accomplished where the *vis à fronte* is low; hence, in the loose tissues and at the periphery of the body.

Trousseau ¹⁴ _{Apr. 14} states that in his experience albuminuric retinitis occurs in about 16 per cent. of patients suffering from Bright's disease; that it occurs not only in the advanced cases, but may be evidence of a simple and transient renal congestion; and that, as a

rule, it is to be regarded an unfavorable omen. A case is reported by Thompson ² of a typical instance of chronic Bright's disease, in whom retinal changes and œdema were marked, and in whom a period of acute maniacal symptoms of six or eight weeks' duration occurred, leaving at the close of that time some mental deterioration. In a case mentioned by Tennent, ²¹³ exhibiting, among other symptoms, cerebral disorder and periods of blindness, this last occurrence was manifest in intervals of varying duration, but later in the course became enduring. There were no gross lesions of the retina to be detected during these periods of blindness, except a contraction of the retinal arteries; late in the case haemorrhages and true retinitis followed, causing the persistence of the blindness.

Von Hoesslin ³⁴ excludes from nephritic insanity such cases as may occur in the course of Bright's disease due not to the nephritis, but to the coincident anaemia and other circumstances. A true nephritic insanity, according to this writer, should occur just as does a paroxysm of uræmia, suddenly, and curable upon elimination of the noxious retained principles—or as a temporary mental inequality occurs with the motor paroxysm in epilepsy. He narrates a case illustrating these views. A man, aged 63 years, who had had chronic nephritis for some years without special symptoms, and who had had slight apoplexies three and two years previously, leaving slight right-sided paresis, was suddenly seized with expansive delusions, just as in general paresis of the insane, and with a number of physical symptoms of motor and reflex value. After a thorough sweating and maintenance of absolute milk diet for twenty-four hours, a marked change for the better was noted, and within a few days his mind was almost as clear as normally. A short while later the patient was discharged, entirely without any evidences of mental change, and some months later died from an apoplexy. Christian ⁶¹ would broaden this classification of nephritic insanities, to include not only those which he regards as urotoxic (corresponding with the above class of von Hoesslin), but also those in whom may be demonstrated the presence of a general change in the vascular coats, manifest both in the brain and other organs as well as in the kidneys. Out of a total of 2000 cases of insanity in the Eastern Michigan Asylum, the writer has collected 37 cases in which the appearance of grave disturbances of nutrition was coincident with the discovery

of albumen and tube-casts in the urine, although in about 12 of these cases the mental affection could not be regarded as depending upon or modified by the renal disorder.

As a method of diagnosis, not so much in Bright's disease as in the rarer but more readily detected pathological changes, tumors or cysts of the kidney, Guyon ^{423 101} _{Apr. 20; June} considers at length the value of palpation of the kidney. According to this authority, palpation is negative when the kidneys are normal. The points gained are sensibility of the kidney, increase or decrease in size, mobility, displacement, and consistency. In order to practice palpation, Guyon places the patient flat on the back with the legs stretched out, palpation being attempted only during expiration. Both hands are used, one placed in the lumbar region, the other parallel to the median line immediately below the costal border. Where there is no pain and the abdominal walls not too thick, the kidney may be well outlined. Sensibility or pain is present only in pathological conditions; mobility may be determined by a sort of ballottement. The consistence may be made out, such as different degrees of induration; but fluctuation cannot be determined.

Israel ⁴ _{Feb. 18, 25; Apr.} ¹⁵ lays down the following directions for the practice of this procedure. The usual mistake is that of deviating too much laterally. If a line be drawn parallel to the median line from the middle of Poupart's ligament, and the hand be placed upon this line to within two fingers' breadth from the point of intersection of the costal border, the normal kidney may be felt. Every effort at relaxation of the abdominal walls should be endeavored, anaesthetics to point of relaxation being often of value. It is also of value to have the colon empty. He mentions several methods in the paper devoted to this subject. In the bimanual palpation in the dorsal position the patient lies on his back on a firm couch, the knees flexed over a pillow. Examining the right kidney the operator stands upon the right side, places the left hand under the lumbar region, and with the right presses from before backward, the middle finger being placed 1 inch below the junction of the tenth rib with the costal margin. Pressure is exerted only during expiration, being kept up continuously until the fingers reach the kidney. Flexing the fingers should be avoided, as it leads to reflex contraction of the abdominal wall. Guyon's ballottement method above, suddenly pressing the kidney forward to

be felt anteriorly, is also described. When these two methods fail, the writer advocates a lateral position for the patient, the legs flexed, and pressure gradually exerted during expiration from anteriorly and posteriorly. An article upon the same subject, reported by Eklund, corresponding editor, illustrated by the records of a case, is published by Stabell. Riess¹¹⁴ B.16, H.1.2 counsels the importance of percussion over the kidneys, with a view of eliciting similar information in the more-gross deviations, as tumors, cysts, or displacements.

Pathology.—The question of the identity of the primary lesions in Bright's disease has led to the division of the medical school into unicists and dualists. July 25, Aug. 8⁹⁹ B.16, H.1.2 The earliest attempt at a histological interpretation of the affection described by Bright was that of Johnson, who separated the changes into various forms of interstitial and catarrhal inflammation. He has been followed by most of the English school, and such of the French as Rayer, Jaccoud, Charcot, and formerly Lecorché. The unicist theory, that all lesions are practically identical in their primary forms, has had substantial support from such authorities as Frerichs, Klebs, Bamberger, Weigert, and from the recent exposition by Lecorché and Talamon. Rattoni,³ Oct. 23 adopting the latter view, does not, however, regard the febrile and chronic forms as invariably different stages of the same condition so far as the primary cause is concerned. This authority refers the acute febrile forms of nephritis to the passage through the kidneys of some irritant, as micro-organisms or their products, or some chemical irritant. The chronic changes are to be regarded as often depending upon clearly separate circumstances,—some different form of microbe; upon vascular, metabolic, or nervous alterations; or upon a continuance of the lesions of the febrile form of Bright's disease.

Willey²² Dec. 26, 88 has examined the kidneys removed from cases of scarlet fever dead upon the fourth, eleventh, eighteenth, and fortieth day from the invasion of the disease, with a view of contributing to the pathological histology of the nephritis of this affection. Only the last of these manifested itself by albuminuria. In the kidney of the first case (dead on the fourth day) the changes appear only in the tubular elements and capillaries of the cortex,—cloudy swelling of the tubular epithelium and minute haemorrhagic foci between the convoluted tubules near the capsule and in the tufts. In the kidney of the second case (eleventh day) the changes

are the same, but more advanced. The tubular epithelium is granular; there are numerous haemorrhages along the capillaries, and evidences of interstitial inflammation in the presence of aggregations of small round cells in the fibrous tissue of the glomerules and along the arteries. In the specimen of the third case (eighteenth day) a considerable interstitial inflammatory process is evident, especially along the lines of the vessels, the interpyramidal arteries, and the afferent arterioles; and the tufts in places are the seat of the same process. The walls of the arteries are also involved, a slight thickening, due to swelling of the middle coat, being demonstrable. In the most-advanced case (fortieth day) all these inflammatory changes are exaggerated, the glomerules being especially affected in this instance. The tufts show various conditions—some in the earlier stages of the inflammation being the seat of a round-celled infiltration, others so swollen as to obliterate the space in Bowman's capsules. The capsules in such case are thickened, sometimes from proliferation of their epithelial lining; or they may be fibrosed, thickened, and contracted, thus splitting up the glomerules into segments and causing atrophy.

Sörensen,³⁷³ reported by Levison, corresponding editor, details his observations upon scarlatinal nephritis, based upon 2100 cases of scarlatina treated between 1879 and 1888, in the infectious hospital at Copenhagen. According to this writer, scarlatinal nephritis is usually, in benign cases, marked by a slight glomerulonephritis, the lining cells of the tufts and the capsule being in a hyperplastic condition. In the more-severe cases there is an exudation from the capillaries throughout the entire organ, sometimes so marked as to be notable to the naked eye. Glomerulitis evinces itself in a urine albuminous, containing blood and other formed elements. Diffuse nephritis presents a urine little changed in composition, but distinctly decreased in quantity; the size of the kidney is enlarged and the consistency decreased. While scarlatinal nephritis is rarely fatal in its immediate consequences, it exposes the patient to grave complications and leaves the kidneys in a condition of easy vulnerability for a long time. Rindfleisch,⁸⁴ in considering the morbid anatomy of nephritis, points out an element leading to the pale-yellow appearance of the cortex seen widely spread or in circumscribed patches in acute cases. This is not, in the writer's opinion, due to cloudy swelling and fatty de-

generation of the cells, as was supposed, but is rather caused by a widening of the lumina of the tubules, causing a separation of the lining cells, and thus presenting numerous facets for the reflection of light, giving the peculiar color. In parenchymatous nephritis the essential feature seems to be a desquamative catarrh, with fatty degeneration and infiltration of the cells, together with a slight increase in the interstitial connective tissue. Rindfleisch looks upon the causation of the acute parenchymatous form as more probably due to the potency of the ptomaines than of the bacteria in infectious diseases. McPhedran ²⁹_{Feb. 15} reports a case of acute parenchymatous Bright's disease occurring in a young man, without demonstrable cause, followed by a pyæmic condition, which suggested to the writer the probability of the nephritis being of micro-organismal origin. Cases of large white kidney are reported by Parke ⁶⁴⁷_{June} (in a patient dead from pneumonia) and Thiry ²⁸⁸_{Feb. 10} (associated with abscesses of the kidney, probably from renal invasion after vesical inflammation). Tennent ²¹³_{June} exhibited a specimen of cirrhotic kidney, associated with congenital atrophic appearances and anomalies of the pelvis of each organ. The left organ weighed less than 1 ounce (31 grammes); the surface was irregular and the ureter divided into two before it reached the pelvis, which was also divided into two, the one division being further subdivided. The right kidney was less reduced, weighing $2\frac{1}{2}$ ounces (78 grammes). The pelvis was divided into three portions, the upper portion being further divided. The upper portion of the organ was more atrophic than the lower, and was hydronephrotic. There was no obstruction in any part of the pelvis; the surface was very irregular and the capsule adherent. Dallemagne ²⁸⁸_{Feb. 11} reports a case of chronic general arterial sclerosis, amounting at places almost to obliteration of the vessels, in which there were present granular and contracted kidneys associated with cardiac hypertrophy. The patient was a woman of 33 years, and did not complain of any symptoms, except intense headaches of varying duration, until a short while before her admission into hospital and death from apoplexy. The question of a specific cause in this case is not broached by the writer. Sundberg, quoted by Eklund, corresponding editor, mentions a case of renal atrophy following arterial stenosis in a man aged 56 years. In this case, the history pointing to chronic interstitial nephritis with consecutive cardiac and cerebral lesions, the

renal arteries were found divided into two branches before entering the kidneys. The lumen of the superior branch of the right vessel was found occluded by an organized clot, and corresponding to the area of supply by this branch the organ presented considerable atrophy. Javaux ²⁸⁸ _{Apr. 21} reports a case of a woman, aged 58 years, in whom an interesting sequence seems probable. The primary lesions, apparently, were renal, leading to interstitial changes; as a consequence a slight endo-myocarditis followed. The slowing of the circulation as a consequence, together with venous relaxation in the latter part of the course of the case, induced thrombosis, and finally, probably from embolism, gangrene of the foot and nose. Cases of cirrhosed kidneys are mentioned by Parke ⁶⁴⁷ _{June} (from a man aged 55, with cardiac hypertrophy), Nixon ² _{June 1; Sept. 16} (from a young woman, aged 32 years, with a history of most intemperate habits and the child of drunkards, associated with wide-spread arterial thickening and degeneration), Barker ⁹⁹ _{Dec. 13, '88} (with hypertrophied heart, and death by apoplexy), and Finley ²⁸² _{Sept.} (a case of latent cirrhosis in a young woman, aged 19 years, without any cardiac hypertrophy or vascular changes).

Where, for some cause or other, renal insufficiency of one kidney occurs, compensating hypertrophy of its fellow is apt to assume an importance in the pathological physiology of the case. Tuffier ⁷ _{Dec. 24, '88} has endeavored to explain this occurrence by experiments upon animals. He states that in animals it is possible, by successive operations, to remove an amount of renal tissue equal to the weight of the two organs, from which he concludes that a true regeneration of renal tissue takes place. Careful examination induces the statement that this occurs primarily from a vascular new formation, developing into a glomerulus and surrounded by a capsule, at the expense of the neighboring connective tissues. Besides this new formation, however, simple hypertrophy of the already-existing glomeruli is also demonstrable.

A recent review of the studies of amyloid disease of the kidneys and other organs is published by Martin, ⁵⁹ _{Feb. 22} in which he refers at some length to the discovery, by Charrin, that the *bacillus pyocyanus* may cause, in certain lower animals, the peculiar disease known by the name of pyocyanic disease, in which, associated with other conditions, amyloid change is apt to be found. From experiments by the same investigator the question of its occurrence

as an infiltration or degeneration is to be answered in favor of the latter theory.

Treatment.—In a paper upon the treatment of acute and subacute nephritis, Delafield⁹ reviews the subject upon the following line: The indications in the first case are to the lowering of the nephritic process by such means as heat to the surface, cupping, saline purgation, and similar measures. As a means of relieving the contracted arteries, the increased tension, and cardiac labor, he commends such remedies as aconite, chloral, opium, and others. The fever is rarely sufficient to demand special attention. As a routine the patient is put to bed, the entire surface washed daily, and for several successive days Epsom salts administered; after this, aconite in minute doses hourly. During this period an absolute milk diet has been adhered to; but from this time on it is gradually diminished and solid food substituted. In the subacute form the indications are to be directed to the nephritis, to the changes in nutrition and composition of the blood, the dropsy, the condition of the arteries, the cerebral symptoms, and the acute exacerbations of the inflammation. The writer recommends, for the fulfillment of the first of these indications, a warm, dry climate and outdoor life. Except during exacerbations, solid food and fats are to be taken, and milk and mineral waters generally avoided. The condition of the blood and the general nutritive processes are to be closely guarded, iron and oxygen often being of service. In caring for any œdema especial attention should be paid to the ingestion of liquids and the use of diaphoretics. Any high vascular tension should be rectified by the use of such means as nitro-glycerin, chloral, or other similar drugs. In the treatment of acute febrile nephritis in children, v. Jaksch¹¹³,₅ states that antipyretics have no influence upon the process, except salicylic acid, which, if given early, tends to diminish the intensity of the febrile attack (usually scarlatinous) and to lessen the danger of a subsequent nephritis. Generally, he is opposed to vigorous treatment, and commends a strict milk diet as the most rational measure. The use of the salicylates is also commended by Illington, corresponding editor. In a case of acute renal catarrh in a young man, with intense anasarca, albuminuria, and uræmia, Milne⁶_{Dec. 8, 1888} states that the condition, uncontrolled by other measures, was overcome by the withdrawal of 12½ ounces (389 grammes) of blood. and after subsequent

treatment by purgation, diaphoresis, and careful diet recovery from the attack was accomplished. Primavera⁶²⁷ recommends, for its alterative value in subacute nephritis, the iodide of sodium or potassium.

Dujardin-Beaumetz⁶²⁸ lays down as the cardinal indications in treatment of renal insufficiency, as occurring in chronic forms of Bright's disease, first, the maintenance of elimination by the portions of the kidneys remaining healthy, and by vicarious means—by diaphoresis and purgation; second, the reduction to a minimum of the various toxines, by regulation of diet, the prevention of alimentary decomposition and of the formation of leucomaines. Practically the same rules are indicated by Huchard.¹⁴ In cases of chronic nephritis, as a remedy for the high arterial tension, nitro-glycerin is highly commended by Bartholow⁶² and Wootten,⁸¹ and, in combination with belladonna and digitalis, by Davis,¹⁴⁴ especially in elderly persons. As a depurant, Baskerville¹⁰⁴ commends the use of Buffalo lithia-water. Jaborandi and its alkaloidal derivative are mentioned by Egan,⁵⁹ Marshall,⁶ and Cleveland⁵³ in connection with their employment as diaphoretics in the exacerbations of chronic Bright's disease, records of cases being published in each instance, all resulting favorably.

As a diuretic agent, *chimaphila umbellata*, or pipsissewa, is recommended by Abet⁶⁷ for its safety and its pronounced progressive effect and lack of cumulative tendency. Golden-rod (*Solidago virga aurea*) is suggested by Clemens⁶ for the same purpose. A combination of caffeine with paraldehyde has, at the hands of Cervello and Caruso-Pecoraro,³¹⁹ been found especially favorable in producing diuresis in Bright's disease accompanied by oedema or ascites. The paraldehyde was administered toward evening, in capsules or solution, in doses of 2 or 3 grammes (31 or 46 grains); the caffeine several times daily in doses of 0.25 to 0.5 gramme (4 to 8 grains). Absorption of exudates under such treatment was particularly rapid, when due to renal or cardiac fault, but in ascites due to hepatic cirrhosis the usual and favorable diuretic action was not obtained. The diuretic properties of calomel have received considerable attention at the hands of Jendrassik,¹¹³ Büshüeff,²⁶ Lépine,³ Erb,⁷⁶⁰ and others. Calomel, to produce diuresis, has this especial disadvantage, that it is liable to cause stomatitis and diarrhœa from the amount required. Its special advantage consists

in its producing a diuresis of considerable degree and duration. Jendrassik regards it as especially valuable in oedematous conditions, particularly in connection with cardiac weakness, but Bięganski² has found that if persisted in for sufficient time in the healthy subject it causes a diuresis in from two to ten days. These observers, as well as Shirtzig,⁷ limit its use almost entirely to dropsies due to cardiac disease, and state that in dropsy of renal and portal origin mercury is of little value. Büshüeff, however, states that in renal dropsy in from three to four days diuresis sets in, lasting five or six days, the daily amount of urine amounting to 3 or 4 litres (3 or 4 quarts), the solids varying in their proportion of excretion in various cases. Similar results are reported from Erb's clinic; but the bulk of testimony as to the value of calomel and the other mercurial salts in the relief of dropsies is unfavorable to their general adoption, because of the frequency of toxic symptoms and their capricious action in oedemas not of simple cardiac origin. Plant²³ recommends in chronic Bright's disease, as a measure tending to relieve oedema by catharsis, daily and prolonged administration of a teaspoonful of Epsom salts in the morning, as recommended some years since by Moore. Bruen⁶² in presenting a case recommended a combination of calomel and jalap.

In the question of diet, Schreiber⁴ June 19; Aug. ¹⁵ denies the propriety of Senator's recommendation to withhold from cases of chronic Bright's disease eggs and other highly albuminous foods. He experimented upon 8 persons with renal disease, giving them, along with their ordinary diet, six to ten eggs daily. Before the experiment they were observed until the daily amount of albumen had been determined and its fluctuations noted. The same observations were made after discontinuing the eggs. In 4 cases the eggs were boiled; in the others raw. Of the former, the patients ate six eggs daily, and in not one case could any increase of albumen be noted. In the second group six to ten raw eggs were daily administered to each patient, and not only did not increase the amount of albumen in the urine, but led to its diminution. Similar results are reported from Leyden's clinic; and these observations agree with those of Oertl, who states that considerable albuminous food may affect an albuminuria favorably. The writer upon these conclusions opposes the idea of a special dietary for Bright's disease, and does not think it in the least indicated. He recommends the

use of an ordinary mixed diet, to which may be added fluid or coagulated albumen, and with which may be combined the free use of milk. Schrwald,³⁴ _{Nov 21, 25; Dec 4, 78} however, in his article upon the relation of the albumens ingested and albuminuria, is in harmony with Senator, and commends a diet from which, as much as possible, the albumens have been withdrawn. Robinson^{1, 5} _{Jan 5; Mar.} urges the value of the absolute milk diet in the chronic parenchymatous variety of Bright's disease, combining the milk, where it is not well borne alone, with Vichy or carbonated water, or lime-water. The prolonged use of such a diet, while it clearly diminishes the albuminous loss, is apt, by action upon the gastric juice primarily and secondarily through the general process of nutrition, to cause anaemia; and for this reason the writer adopts the plan of occasionally substituting a small amount of farinaceous and vegetable food, with a small quantity of broiled or roasted meat early in the day. In the lardaceous kidney, the writer recommends, when the disease causing the amyloid change is not of too great importance to be overlooked, the same principles of diet. In the interstitial Bright's disease he adopts a dietary from which nitrogenous foods are largely withheld, employing milk and cream in abundance, and an otherwise vegetable list of foods. In a leading article in the *University Medical Magazine*,¹¹² _{Feb.} Gaucher's experiments upon the toxic effects of the subcutaneous introduction into the system of beef-tea and meat extracts are commented upon, and these articles recommended to be excluded from the dietary of Bright's disease, lest in a maloxidized state they add to the intoxicating principles met in this affection. Girard¹⁹⁷ _{Mar.} and Demiéville¹⁹⁷ _{Apr.} each report bad effects from the use of diluted hydrochloric acid in the treatment of the dyspepsia associated with chronic Bright's disease. In both cases detailed by these writers the administration of this remedy was followed by haematuria of several days' duration, albuminuria, and the appearance of casts in the urine. The administration of zinc salts to animals has, in the experiments of Helpup,⁶⁹ _{Sept 12} caused renal parenchymatous inflammation in 79 per cent. of his cases. In the administration of salicylic acid in chronic renal inflammation, Chopin²² _{May 2} has noted a considerable delay in excretion, an increase in albuminous loss, and a decrease in the total amount of the urine. Feeney⁶ _{Aug.} has recorded the rapid and complete disappearance of œdema and uræmic symptoms after the administration of antipyrin.

Tyson,⁶¹ in a paper on the induction of labor in Bright's disease, formulates his views as follows: Premature labor should be induced in cases where in previous pregnancies the symptoms were extremely severe and dangerous, in primiparæ in whom Bright's disease was manifest before pregnancy, and in women suffering from advanced Bright's disease whose former pregnancies have given no knowledge of the tendency of the case.

ANOMALIES OF THE KIDNEY.

Dumur¹⁸⁸ reports a horseshoe kidney of a rather peculiar appearance. It was provided with two ureters, and in the portion of the organ corresponding to the right kidney the ureter divided into two immediately before entering the pelvis, which was likewise double. Northrup,⁵⁹ in making an autopsy of a child aged 5 weeks, recently met an instance of the arrested development of one kidney; the ureter of the left side was represented by a mere rudiment, at the extremity of which was a bulbous tip 1 centimetre long and 2 millimetres in breadth, representing the kidney. This rudiment was found lying on the left common iliac artery at the level of the last lumbar vertebra, the ureter having evidently not increased in length for some time. So far as could be observed there was no arterial supply to the rudimentary organ. An interesting anomaly in form and position found in the left kidney of a boy is recorded by Carslaw.²¹³ The kidney lay over the bodies of the fourth and fifth lumbar vertebrae and the corresponding portion of the psoas muscle, thus concealing partly the left iliac vessels. The kidney was placed almost transversely to the body-axis, and was divided into two lobes by a fissure upon the anterior surface, each lobe being supplied with vessels and a branch of the double ureter.

Potherat and Morderet⁷ demonstrated specimens of misplacement of the kidneys of a woman. Both kidneys lay at the inferior portion of the abdominal cavity, just above the superior aperture of the pelvis. The adrenals were normally placed. The right kidney received two arteries, both from the aorta; the left, three arteries, all from the aorta.

Poirier^{7,18} encountered the following anomalous conditions in the body of a woman: The right kidney was placed in the posterior portion of the iliac fossa of the same side. Its size was normal; the hilus was upon the anterior surface, and from it passed

a single large vein joining the vena cava at the level of the cartilage between the second and third lumbar vertebrae. No arteries entered the hilus, but six distinct arteries arose from neighboring vessels and entered the parenchyma at various points. The left kidney lay in the posterior portion of the pelvic cavity, slightly to one side. As to the right, it was somewhat lobulated; the hilus was directed anteriorly, and from it came a single large vein to join the vena cava with the primitive iliac. This kidney was provided with four arteries, having much the same arrangement as those of the right kidney.

Floating Kidney.—Griffiths² has analyzed 14 cases of floating kidneys in which the average age of the patients was 41 years. In 12 cases the right organ was the affected one; and, with the exception of one unmarried woman, all occurred in females averaging over four confinements each. The urine in 10 cases was normal, in the others showing albumen, varying from a trace to $\frac{1}{10}$ bulk. In one case the heart was congenitally displaced. In half of the cases no knowledge of any tumor was had before admission into the hospital, and in but a few of the cases was treatment sought for the condition. Barry¹² reports a case of floating kidney in a multipara, aged 42 years, of excellent physique, whose health had since her last confinement, two years previously, failed, and who noted the presence of an abdominal tumor several months after labor. Death occurred about six weeks after the first examination from a sudden and violent peritonitis; no autopsy was permitted. Ferguson^{21,2} relates an instance of floating kidney in a III-para aged 47 years, the youngest child being 11 years of age and the patient about the menopause. After an acute illness rapid emaciation set in (the presence of gastric ulcer being suspected), and during an exacerbation the right kidney was detected as an abdominal tumor. The application of a pad and the eventual cure of the primary affection were followed by the disappearance of the tumor. Guyon⁶ advocates, in these cases, nephorrhaphy instead of extirpation of the movable organ, and interferes only when the symptoms are of grave import. Otherwise, a well-adjusted pad is all that is necessary.

TUMORS OF THE KIDNEY.

A rather peculiar tumor is described by Saint-Germain,⁷ found in one of the kidneys of an old laboring man, never having

given rise to symptoms during life. The tumor, the size of a hazel-nut or larger, occupied a position near the median line of kidney toward the posterior surface, was rounded, lobulated, encapsulated, rather soft, and of a pale-yellow color. On examining it carefully, it had a peculiar glistening appearance due to the presence of numerous cholesterin in plates. Under the microscope, a small portion examined seemed made up of granulation-like tissue, containing a great number of newly-formed vessels, pus-corpuscles, and red blood-cells. Cornil, who saw the growth, suggested that it might be a renal adenoma undergoing suppurative changes. Davier stated that he looked upon the formation as the result of an infarction, but in this view Cornil refused to coincide. A case published by Pilliet⁷ presented multiple adenomatous tumors in both kidneys of the subject, a man aged 69 years. These tumors were not diagnosed during life. There was but one in the left kidney; two in the right, one placed anteriorly, the other posteriorly, the latter the largest of the three tumors and about the size of a small apple. These tumors were of a whitish color, rather friable, clearly circumscribed (but apparently not encapsulated), and all situated in the cortical structure. On close examination with the microscope, an adenomatous nature was evident, but certain places were clearly becoming cancerous. A similar growth, single, but quite large, occurring in the left kidney of a man aged 67 years, is published by Girode.⁷ The tumor was painful on pressure, and for several years prior to death gave rise to transient haematuria. Upon section of the body, a large tumor, adhering to the neighboring viscera and to the diaphragm above, was found occupying the left kidney. Beneath the superior surface of the tumor a large haematic cyst was noted, containing about 600 grammes of blood. The tumor was soft and like an encephaloid cancer. Only a small portion of the organ was unininvaded, and that was the seat of degenerative processes. The vessels and ureter were free from extension growths, and the right kidney was enlarged, hard, and the seat of numerous subcapsular cysts. A number of small adenomata were found at the upper portion of the jejunum of the case. Microscopically, there was between the tumor and the unininvaded kidney structure a narrow zone of loose connective tissue showing epithelial invasion of an adenomatous nature. In the older portions of the growth true cancerous formation was to be seen, with here and

there evidence of colloid degeneration. In each of these cases the adenomatous structure of the neoplasm followed the structure of the convoluted tubules, somewhat larger than the latter, but having the same sinuous character as well as the same histology. Primary cancerous neoplasms of the kidney are mentioned by Lanceriaux,¹⁰⁰ Feb. 18 Lincoln and Lamb,⁶¹ Mar. 25 and Mackenzie.⁶⁴⁵ Dec. 28 The first of these cases occurred in a man aged 58 years, with a history pointing to renal cirrhosis. After hospital admission the passage of blood in clots and as ureteral casts, persisting pains, and the presence of a tumor in the left renal region, recognizable upon deep palpation as a large, smooth, and hard growth, led to the diagnosis of renal cancer. At the autopsy the diagnosis was verified; a large tumor extending over the posterior portion of the abdominal cavity on the left side to the anterior superior spine of the ilium was removed. The growth had eroded the spine slightly, and on examination the renal vein was found almost occluded by a white cancerous growth extending to the vena cava. None of the other organs were invaded. The case reported by Lincoln and Lamb occurred in a man aged 61 years; the condition was recognized during life, but for prudential reasons no operation was performed. The right kidney was enlarged to at least twice the normal size; the lower half was the seat of a soft cancer in an advanced condition of degeneration. The *débris* of the tumor degeneration was noticed to contain in the recent state considerable clotted blood, and in the midst of the mass ten calculi of varying size were discovered, the largest being branched. The upper portion of the kidney was converted into a sac, with walls of varying thickness, and in the recent state contained purulent urine; it was probably caused by retention due to pressure of the subjacent tumor upon the ureter. The capsule of the kidney was everywhere adherent and fatty, and contained several neoplastic masses of small size, with central softening already advanced. The pelvis of the organ was dilated and ulcerated; the upper portion of the ureter was dilated, thickened, and presented several small cancer-nodules. The right supra-renal body was enlarged and cancerous; the left kidney was enlarged and the seat of a number of metastatic growths, superficial and deep-seated. The vena cava was dilated and, opposite the tumor, contained a cancerous mass adherent to the walls, and the supra-renal vein also contained evidences of metastasis. The

other organs, except several points in the great omentum and the duodenum near the tumor, were uninvaded. Mackenzie's case occurred in a female child, aged 4 years, in whom the first symptoms (six months prior to death) were abdominal pains about the umbilicus and rapidly increasing size of the abdomen; later, the sense of tumor in the right side, with fullness in the lumbar region. On plunging a trocar into this enlargement, a soft, grumous material was withdrawn containing evidence of cancer. On section sometime later, an enormous tumor, entirely replacing the kidney, weighing 22 pounds, of irregular shape, and occupying the greater part of the enlarged abdomen, was removed. The rest of the child weighed 39 pounds. On microscopic examination the growth was found to be a typical example of medullary cancer. Javaux²⁸⁸ found in the body of a woman who had had a cancer of the womb, with vesico-vaginal fistula, a condition unsuspected during life in the presence of cancerous invasion of both kidneys. Princeteau¹⁸⁸ narrates the case of a man, aged 40 years, living when reported, who became five years previously the subject of haematuria. Shortly after, a tumor was noted in the right abdominal cavity, which grew to occupy the whole lumbar region and to extend to the iliac crest. There was no fluctuation; the tumor was mobile and hard; the urine was somewhat decreased in quantity, but contained an excess of urea (25 grammes per 1000 cubic centimetres— $6\frac{1}{2}$ drachms per quart), blood, and albumen. Grancher²¹² mentions the occurrence of renal tumors in several children observed in the Hôpital des Enfants Malades, in Paris, in the service of Hutinel, one in an infant of 28 months, another (of the size of the foetal head) in a child of 5 years. In referring to the treatment of such cases, the writer urges, where the condition is early recognized, and without symptoms of generalization and with no evidences of serious functional disturbances, that extirpation be attempted.

RENAL CYSTS.

Leaving out of consideration the miliary cysts of retention origin met with in interstitial nephritis, Lejars¹⁰⁰ _{Apr. 20} distinguishes, as varieties of renal cysts, the large serous or haematic cysts, hydatid cysts, and the large polycystic kidney (acquired or congenital). Hydatid cysts are relatively rare, 112 cases of renal hydatids occurring in the 1856 cases of hydatids collected by Davaine,

Neisser, and Thomas. The large serous or hæmotic cysts are somewhat more frequent, while the large polycystic kidney occurs most often of these varieties. The large polycystic kidney is more frequent in men than in women (37 to 29); the serous, on the contrary, more frequent in women than in men (16 to 13); as, too, the hydatids (12 to 9). As to age, the polycystic kidney may occur congenitally; in adult life it is usually met between the ages of 40 to 45 years, although it has been reported at 81 years. The hydatids are usually encountered in the early portion of the third decade of life; the serous cysts, in the latter portion of the second decade. The tendency of the paper of Lejars is to support the neoplastic idea of the origin of cysts, calling attention to the frequency of the coincident presence of cysts in various organs; or they may be looked upon as tending, in evidence, to a general neoplastic glandular disease.

The author is inclined to view them as cystomata arising from proliferation of epithelial elements of the parenchyma, with subsequent disintegration of the mass. In the congenital cysts much the same argument holds; and these are also probably of neoplastic origin. They are apt to be multiple, and not infrequently show hereditary influence.

Stavely⁵⁹ _{May 18} describes an enormous hydatid cyst of the right kidney, occurring in a Russian Pole aged 43. Death occurred suddenly after symptoms of rather vague character, aside from those indicating the presence of abdominal tumor in the right lumbar region. The cyst consisted of a large sac with laminated wall, and contained over 9 pints (5 litres) of serum, besides considerable white, gelatinous material and a single daughter-cyst. The left kidney was largely hypertrophied (12 $\frac{3}{8}$ ounces—373 grammes) from excessive function. Gratia²⁸⁸ _{Feb. 10} describes the following case: About two years prior to his death, at the age of 63 years, the patient developed a hæmaturia which defied diagnosis in spite of an exploratory incision in the hypogastric region. Just before death, renal colic of intensity occurring, nephrectomy was about to be performed, when the patient suddenly died from the anaemia. Upon cadaveric section, the right kidney was found the seat of a hæmorrhagic cyst about the size of a hen's egg or larger, clearly encapsulated, and surrounded by the renal capsule as well. It contained a grumous mass of blood-cells without the fibrin of a clot.

But little normal renal tissue remained and the left kidney was atrophic. Newman,²¹³ in discussing the diagnosis of renal cysts, in a man aged 46 years, suffering from dyspeptic symptoms, headache, giddiness, persistent renal pain and haematuria, lays stress on the development of the symptoms. The pain first developed on the right side, and, although severe, was not attended by haematuria; eleven months later it came on the left side, accompanied by haematuria. The possibility of renal tumor was disregarded because of this circumstance, and because, upon examination of the urine, the albumen was found in excessive proportion to the haemoglobin, indicating other sources besides the blood. The recognition of enlargement gradually increasing, in both renal regions, completed the sequence and fulfilled the diagnosis. Ritchie³⁶ mentions a large renal cyst taken from the body of a woman aged 45 years. Nine years previously, after a confinement, a tumor was noted, but in the absence of symptoms was not diagnosed. Death occurred from uræmia. Holt⁵⁹ presented before the New York Pathological Society a small cystic right kidney, removed from the body of a female of middle age. The organ was composed almost entirely of cysts, and singularly was apparently unprovided with a ureter. Very little renal structure could be recognized, the cysts being so numerous. The organ weighed 1 ounce, the left kidney weighing 5 ounces. Bagot¹⁶ exhibited before the Irish Academy of Medicine a foetus with congenitally cystic kidneys. The abdomen was enlarged, the peritoneum over the kidneys thickened, and the ureters very thin and cord-like, but pervious. Both kidneys were symmetrically enlarged, but showed no cysts upon the surface. On section, however, the interior of the organ was replaced by a fine net-work of minute cysts (the fine cystoid of Virchow). The tubules had undergone an irregular dilatation, until in most portions of the organs they were represented by large epithelial-lined spaces. Loveland¹ publishes an account of enormous and cystic kidneys removed from the body of a man aged 43 years. The patient had had history of renal disease lasting at least five or six years, but was confined to bed but a few weeks before death. The right kidney was 12 inches (0.30 metre) long, 8 (0.20 metre) broad, and 6 to 8 (0.15 to 0.20 metre) in thickness; the weight was 8 pounds (4 kilos). The left kidney was 14 inches (0.36 metre) long, 9 (0.23 metre) broad, and

weighed 10 pounds (5 kilos). Multiple cysts occupied each organ, varying in size from that of a pear to that of an egg, composing the bulk of the renal mass and apparently containing urine. A similarly enlarged and cystic kidney was removed from a woman by Monod, ³ July 25, who expected to deal with calculous obstruction upon operating, but, finding the condition a general cystic degeneration, extirpated the entire organ. Bantock, ⁴⁹ Nov., '98, reports 2 cases of cystic kidneys removed by operation, in which the presence of calculi apparently in causal relation was demonstrable. In each case there was the history of slight injury, with transient haematuria, although the injury probably had no other effect than to show the presence of disease.

Hydronephrosis.—Edes, ⁹ June 29, Aug. 10, adds to the etiological factors in hydronephrosis several illustrations of the production of this condition by spasm and paralysis of the bladder, both of these tending to produce counter-pressure to the flow of the urine from the kidney, and causing dilatation of pelvis and ureter. Griffiths, ² Feb. 9, upholds two distinct histological processes as occurring in kidneys the seat of hydronephrosis. The first, present in all examples, results from the pressure of the accumulated urine in the distended pelvis, and affects only a thin layer of tissue immediately subjacent to the surface pressed upon. The changes are due to proliferation of the interstitial tissue, disappearance of some of the tubules, and dilatation of the remaining ones. The second series of changes result from compression of the renal vessels in their course over the distended body of the pelvis, and are entirely comparable to the ordinary general interstitial proliferative processes.

Lemoine, ²¹¹ Sept. 1, records a case of hydronephrosis in a man aged 24 years. The left kidney was the seat of a large cyst at the surface of the hilus, a small portion of normal kidney remaining at the extremities of the organ. The pyramids presented the rather unusual appearance of having considerable smooth muscle-fibre between the tubules and about the vessels. The ureter was dilated for several inches at its upper portion, but lower down it was reduced to an almost impermeable cord. The opposite organ was hypertrophied, the enlargement being largely due to the turgescence of the glomerules and the swelling of the epithelial elements. Lorain, ¹⁴ Mar. 10, has met, in the body of a man aged 50 years, a hydro-

nephrotic kidney, the pelvic enlargement being equal to that of a child's head. Ten years before, a motility of the kidney was recognized, and it was probably due to some motion of the kidney that the condition arose, as at autopsy the ureter was found bent upon itself about the kidney in a manner preventing the escape of fluid. Another case, occurring in a woman aged 59 years, under exactly the same circumstances (probably the identical case), is credited to the same observer.²⁴ Grandmaison⁵ publishes the notes of a case of hydronephrosis of the right kidney of a young woman, due to compression of the ureter by an osteosarcoma of the pelvis. Cases of intermitting hydronephrosis are mentioned by Kappe⁴ and Oehme.¹²³ The latter's case occurred in a woman aged 59 years, in whom it first appeared six years previously with pain in the left loin, these attacks of renal pain lasting for several days and disappearing entirely—the tumor appearing and vanishing at intervals. Kappe's case also occurred in a woman (aged 38 years), the tumor in the right kidney being at times as large as a double fist and again entirely absent. Acker⁶¹ reported the case of a colored child aged 5 years, dead of general tuberculosis, in whom the ureters and pelvis of the kidneys were markedly dilated, the dilatation extending almost to the bladder, where there was to be recognized a constriction but no impermeability. Barrs⁶ noted the case of a man, aged 31 years, in whom during life there were presented the symptoms usual to an acute Bright's disease. There was some abdominal enlargement and a tumor was detected and aspirated, 18 ounces (560 grammes) of fluid being withdrawn. After death, at section it was found that both kidneys were mere sacs, the pelvic cavities being enormously dilated. To all appearances the only cause for this double hydronephrosis was the congenital narrowness of the ureters and the manner of their origin from the pelvis so accomplished that the flow of urine must have been impeded. Cohn⁴ reports a case of hydronephrosis, possibly starting in pregnancy, in a woman aged 30 years, in whom a path of relief was afforded by the spontaneous establishment of a pelvic fistula. Branfoot² publishes the records of a case of cystic or hydro-nephrotic kidney in a young Hindoo woman, aged 14 years, which was removed by operation. The case progressed favorably at first, but presently peritonitis set in and the patient died.

INJURIES TO THE KIDNEY, ETC.

A man aged 53 years, reported by Ryan,^{285 Aug.} fell from his horse upon his right side. For some time there was a haematuria; but within a month there supervened symptoms of suppression, with œdema, and some swelling in the right lumbar region, with a sensation as of deep fluctuation. Upon incision into this part a large amount of a serous fluid, without urinous odor, was evacuated, and the peritoneum was found dissected from the posterior wall of the abdominal cavity, the kidney standing out in relief. Healing was readily accomplished, save a sinus, through which, later, urinous fluid was discharged; but eventually this also closed.

Gage^{29 Nov. 14} mentions the case of a young man who, while skating, was struck in the loin by the shoulder of a fellow-skater and prostrated. For some weeks blood was passed in the urine, together with albumen and casts. There was a slight swelling perceptible in the right flank; but at the end of eleven months, the rest-treatment having been carried out, the urine was apparently entirely normal save for a trace of albumen, and no active symptoms whatever were manifest.

Abscess of the Kidney.—Cleveland^{59 Jan. 19} mentions the case of a young woman, aged 29 years, in whom a pyonephrosis of unknown origin was diagnosed in the left kidney. The organ was incised and the cavity cleared of pus and cleaned, the kidney being then left *in situ*. Lucas^{6 Dec. 1, '88} reports a case of contracted and puckered kidney removed from a boy of 11. The kidney had suppurred, and an opening was made through the loin twelve months prior to the last operation; nine months later a calculus was removed, and, the suppuration continuing, finally the remains of the organ were entirely removed. Audain^{7 Jan.} publishes the records of a case of subcapsular renal abscess in a patient in whom there existed a purulent cystitis, due to primary vesical irritation by a calculus. Ascending ureteritis, pyelitis of the left kidney, and the establishment of a large abscess beneath the capsule followed. In relation to the infectious abscesses of the kidney, Gennes and Hartmann^{7 Dec. 7, '88} believe, with others, as Clado, Doyen, and Albaran and Hallé, that they may be of one of two origins: resulting either from an ascending lesion of the lower urinary tract or from an embolic process. Unilateral invasion is usually of the first variety. An exclusive dissemination of the abscesses through the

cortex is usually of the second. The nature of the microbe at bottom of the process is not definitely established. These investigators have, in two cases, shown the presence of the usual diplococci of suppuration, and, in a third, staphylococci.

Speaking of perinephritis of renal origin, Albarran⁸² July 27 distinguishes three varieties: (1) where the capsule is thickened and more or less fused with the fatty envelope; (2) a form involving the fatty capsule, especially pronounced in calculous pyelonephritis; (3) suppurative perinephritis, the abscess being either subcapsular or occasionally completely enveloping the kidney. An instance of this last form is mentioned by Jones,⁷² June in which case successful treatment was accomplished by incision, washing out thoroughly the cavity and all the sinuses, and packing with iodoform cotton.

RENAL SYPHILIS.

Mauriac,¹⁰⁸ Feb. 15 briefly, makes the following statements: Syphilis may invade the kidneys at any period in its course, and the usual lesions are entirely comparable to those of Bright's disease. Not rarely, however, gummatous tumors may be formed. Syphilitic renal changes stand in the fifth or sixth place in the order of visceral syphilis, after the changes of the genital organs and the encephalopathies. In the localization of the affection not infrequently another cause, as alcoholism, tuberculosis, or gout, may have some etiological importance. The administration of mercury, so long as it is within reasonable bounds, has no influence in the production of these lesions. Syphilis presents itself in the renal system, either early or late, near the time of the primary lesion or coincident with the mucous patch, or in the tertiary period of the disease. In the early manifestations the essential cells of the organ are affected, and a kidney not unlike the ordinary large, white kidney results. In the later manifestations the kidney is usually the seat of an interstitial and contracting process, but gummata or amyloid change may be encountered. Mixed treatment is to be commended, and mercury is essential. Carmelo Andronico⁵⁴⁵ Dec., '88; Mar.²²⁴ '89 suggests, from a general review of the literature of the subject, much the same outlines of the syphilitic nephropathies.

TUBERCULOSIS OF THE KIDNEY.

Guyon¹¹³ Jan. 6 to 20 states that childhood is an age more or less predisposed to this condition, that after children adolescents are most

frequently affected, and that of adult life the ages between 20 and 40 years are usually those manifesting the disease. The author states that renal tuberculosis occurs more frequently in men than in women, and is in the former not rarely associated with tuberculosis of the genital organs. Tuberculosis, according to the author, occurs in man in two forms, the acute miliary and the chronic form, just as in other portions of the body. The former variety is rather more frequently met in children than elsewhere; and the kidneys are less often invaded than the other organs. It usually involves both kidneys, and is found in the cortex as miliary granulomata. In the chronic form the parenchyma is the frequent seat of marked degenerative changes, in which very often the calices and pelvis are implicated. Not infrequently but a single organ is involved; so, too, where the urinary invasion is general, the genital apparatus is also apt to be invaded. An interesting example of the path of infection in one of these chronic cases was demonstrated by Kümmel⁶⁰ in the tubercular kidney of a young female, aged 22 years, of excellent family record. There was a history of a previous vesical catarrh, followed by pain in the right lumbar region, the development of a floating kidney, which, upon operation, was found to be caseated, and was removed, the operation being followed by recovery and improvement. Cases not showing any marked difference from the above in the appearance of the organ or the character of co-existing lesions of the bladder and ureter are mentioned by Reilley,¹⁹ Gemmell,²¹³ Mar. Ritchie,³⁶ Feb. and Anderson,²¹³ July as instances of primary renal tuberculosis, with extension by the ureter to the bladder. The true sequence would apparently be directly the opposite, arising from some overlooked urinary infection. The precedence of vesical symptoms in all these cases is apparently overlooked, although the post-mortem evidence clearly indicates considerable duration of vesical inflammation from the intense thickening of the walls as described. The fact that but a single organ in these (as, too, in many other instances) showed evidences of tubercular invasion is by no means inconsistent with the upward advance of the process, and would be directly opposed to urinary infection through the general system. Why vesical tubercular inflammation should advance to the invasion of but a single ureter, pelvis, and kidney should not be regarded as difficult of explanation. Either the inflammatory process affects one ureter by acci-

dent or because of less resistive power of the tissue due to passing ureteral dilatation following vesical spasm; or as a result of spasm of the bladder the downward flow of urine is seriously interfered with and slowed, and in the direction of least resistance the infection is borne. A case occurring in a young girl mentioned by Drumm¹⁸⁸ _{May 31, Sept. 29} is referred to a cystitis the etiology of which possibly depends upon infection occurring during excessive onanism. In this instance a large perinephritic tubercular abscess was developed finally. Bonneau⁷ _{p. 362} records a case occurring in a carter, aged 35 years, in which the sequence of infection is clearly an upward extension from the bladder; the opposite kidney was unaffected, but in a condition of compensatory hypertrophy. Stone⁶¹ _{Nov. 9} mentions a case occurring in a woman, aged 22 years, following a cystitis which had its origin at least six years prior to death. Not until a few months before death were there signs of renal involvement, although it had probably existed some time.

Baudet¹⁸⁸ _{Aug. 18} records a case, in a 15-year-old boy, in which the earliest point of invasion, so far as determined, was the testicle, then the prostate and bladder, thence along the ureter to the kidney. Faure⁶¹ mentions a case in a man, aged 24 years, who, upon entrance into the hospital, showed symptoms of an intense cystitis; and at the autopsy, a year or more later, the prostate was found involved, the bladder thickened and ulcerated, the right ureter thickened, ulcerated, and the seat of cheesy change at several points, and the kidney enlarged and in a cheesy and purulent state. Philip⁵ _{July} had met a case of marked tubercular ulceration of the bladder, in which, at autopsy, the left kidney was found enlarged and tubercular. Schmitt⁵⁹ _{June 22} reports a similar case in a woman aged 53 years. Of the 12 cases of cheesy renal tuberculosis mentioned above, 5 cases occurred before 20 years of age, 3 between 20 and 30, 2 between 30 and 40, and 1 above 50 years, the age of one case not being recorded. Iscovesco,¹²³² in an article upon scrofulosis of the kidney, recognizes, among the changes, those of cheesy and tubercular kidneys, amyloid change, and diffuse nephritis. Contrary to the usual opinion, he believes that amyloid change is exceptional in the scrofulous, but a diffuse nephritis is quite frequent. He states that it is possible to find the amyloid change associated with inflammatory process, however. This diffuse nephritis manifests itself to the naked eye as a large

white kidney, the lesions being parenchymatous and interstitial. Clinically, such a condition may remain latent indefinitely or may manifest itself promptly by albuminuria and the ordinary symptoms of the large white kidney. Death in such cases usually takes place by uræmia in from six months to two years. Strübing³²⁶ reports 2 cases of renal struma. He defines heterologous struma of the kidneys (which, according to this writer, springs really from the adrenals) as characterized by the formation in the kidneys of large cysts filled with peculiar bloody and fatty contents. The writer classes it with the malignant tumors; he states that both kidneys may be involved, though this is unusual, and that metastasis is frequent. Where it is clearly limited to a single kidney, extirpation of the organ is to be performed. In the removal of the kidney, or its inability from whatever cause to perform its functions, the fellow-organ undergoes a compensating hypertrophy (Svensson,³⁷⁰ quoted by Eklund, corresponding editor). This hypertrophy, according to Tuffier,²⁶⁶ consists in both numerical and simple enlargements of the remaining renal tissue, with new formation of glomerules and tubules.

URÆMIA.

Thudichum,²² reviewing his methods in the isolation of the urinary alkaloids, attributes the phenomena of uræmia as probably caused either by these alkaloids—creatin, urochrom, urotheobromin, and several others combining with platinic or zinc chloride—or by the products of their decomposition. Lépine²¹¹ has succeeded in producing uræmic-like phenomena by injecting into the ureters sterilized salt water, thus producing counter-pressure to the secretion. This procedure, at first, after several hours, provokes, in a healthy dog, a progressive and considerable rise in temperature, then dyspnoea, and finally death. This forcible retention of the urine very probably leads to a resorption into the system of the toxic principles of the urine—one of which, perhaps, possesses thermogenic properties. Bouveret,²¹¹ with the above experiments in mind, reviews two instances in which well-marked hyperthermia was a feature; and in a case published by Holland,¹⁰⁴ dying of uræmia during utero-gestation, the temperature is recorded as ranging between 102° and 105° F. (38.88° and 41° C.); as, too, in cases reported by Moore,⁴¹ and Stallard.⁷⁷ Debove,¹⁷⁷ investi-

gating the cause of slowness of pulse, attributed by Charcot to bulbar lesions, has not succeeded in demonstrating any such lesion, but has met in conjunction with slow pulse-action evident renal insufficiency, and suggests that the condition of uræmia bears some influence upon the production of this phenomenon. Girode¹¹⁸ calls attention to the early occurrence of uræmia in a child of 8 years, presenting a predominance of bulbar symptoms, tetaniform convulsions, sialorrhœa, hyperthermia, and death in a short time. Another case occurred in a boy, aged 15 years, in whom there was a marked alcoholic history. These cases indicate that, while the condition is usually of late appearance, under favorable circumstances it may set in early, and that its usual late manifestation is not so much due to the age of the renal organs as to their lessened vital resistive power. Dunin⁴ Feb. 18 publishes the notes of 5 cases of uræmia, all showing phenomena pointing to local cerebral disease, 4 simulating the lesions of Jacksonian epilepsy, the fifth evincing symptoms of the optic functions indicating lesions of the corpora quadrigemina and posterior cerebral lobe.

In cases of uræmic intoxication, Peter¹⁰⁰ Sept. 3 recommends, for the purpose of sympathetic stimulation, the subcutaneous administration of ether, with a view of hastening the excretory processes. Partzevsky¹²⁹ Feb. commends benzoate of soda in uræmia, believing it to lessen the duration and the severity of the convulsive attacks. Mackenzie,² Apr. 18; ⁶ Aug. 3, 10 following Loomis and others, urges the use of morphia in those cases of chronic uræmia in which there is need to counteract the effects of the retained urinary poisons. He narrates several cases in which progressive and urgent symptoms, as headache and dyspnœa, were at once relieved by administration of this drug.

DISEASES OF THE BLADDER.

CYSTITIS.

Silcock⁶ May 11 demonstrated a case of vesiculated bladder, a specimen obtained from a male dead after nephrectomy (a calculus being found later, impacted in the lower part of the ureter, which was dilated and thickened). The vesicles varied from the size of a pin-head to that of a small shot, and were especially scattered over the trigone. They contained blood-stained, serous fluid at the autopsy. They seemed to have originated in

small foci of leucocytes or young epidermal cells, the result of rapid focal epidermal proliferation, with secondary degeneration and solution. Przewoski,²⁰ under the term "nodular or follicular cystitis," describes a process which may hold some relation to the foregoing, but which the author has demonstrated to be tubercular.

Brown²²¹ calls attention to the fact that many of the chronic cases of cystitis in females are really due to the irritation of the bladder by the "hysterical urine" of low gravity and almost devoid of salts. He further makes a timely suggestion as to the etiology in referring to the lack of proper frequency in the emptying of the viscus in these cases from false modesty or a lack of accommodation. The same end is brought about in those cases in which there exists atony of the bladder, with the retention of a part of the contents (White,¹¹² Casper,⁴), the residual urine being particularly prone to fermentative changes. Where the retention is complete, from obstruction or other causes, an especial liability to vesical inflammation results, the dilatation of the viscus leading to rupture of its mucous coat, and thus affording numerous foci for the invasion by micro-organisms that may gain entrance into the bladder (Guyon,^{164 266}, May 9, June). Fenwick² looks upon the presence in a bladder of residual urine as more or less predisposing to cancerous involvement. In pathological conditions the normal sensibility of the bladder to tension is exaggerated, causing frequent micturition; and, according to Guyon,⁶¹ this sensibility of the desire to micturate is not in any way local to one point of the mucous membrane, but is situated in all parts of the organ. There is also added a sensibility to contact, and actual pain not infrequently manifests itself. Hartmann,¹⁰⁰ in considering the neuralgias of the bladder, divides them into two great classes, idiopathic and symptomatic. The latter class depends either upon some lesion of the nervous apparatus, as in tabes (Weir Mitchell), or general paralysis (Verneuil), or to some lesion of the urinary tract or of the neighboring organs. The former are those dependent upon either a localized cause (as the constant pressure and trembling motion transmitted by certain forms of seats to the perinæum) or general, as gout or rheumatism. A case of exfoliation of the vesical mucous surface in an old man is mentioned by Semeleider, of Mexico, corresponding editor,⁶⁷³ there being a layer of embryonic tissue replacing the epithelium. Callionzis²⁶⁶ publishes the notes

of a case of chronic cystitis, the walls of the bladder having become encrusted with a phosphatic deposit. Relief was obtained by thoroughly scraping the walls with a blade of a lithotrite, and afterward washing with a hot solution of boric acid. Bryson ^{June 15} calls attention to the existence of rings (curvations) about the neck of the bladder, as a result of chronic cystitis. Tricomi, ^{Jan. 20; Oct. 96} studying the absorptive power of the bladder in rabbits, guinea-pigs, and dogs, states that in healthy states of the viscera the absorption is the same as in hypodermic injections for strychnia, prussic acid, chloroform, and sulphuretted hydrogen, less rapid for cantharidin, carbolic acid, corrosive sublimate, morphia, and especially cocaine. Putrefied liquids are not readily absorbed. Where the mucous coat is in a pathological condition, the absorption of the first series of substances is the same as in a normal state of the coat; of the second series, less rapid. Injection of micro-organisms is always followed by signs of intoxication. In suppurative cystitis the absorption of gases is as rapid as in hypodermic injections of the same.

Lavaux ³ _{Apr. 24; Aug. 14} ²² writes against the indiscriminate employment of hypodermics of morphia in the treatment of painful cystitis, having observed cases of eclampsia and other untoward effects. He commends instead the use of cocaine. Frey ¹¹³ _{May 19, June 22} ⁷⁶⁰ regards iodoform as a drug of value in cystitis of the chronic form, of almost any origin, combining with its antiseptic and deodorizing powers styptic and analgesic properties. It is his practice to thoroughly wash out the cavity with lukewarm water, and then throw in a solution containing iodoform, glycerin, and a little gum tragacanth, making injection as often as every third day. Vansant _{Feb. 1} ⁶² commends the use of salol in cases of ordinary chronic cystitis; Smith ⁵⁹ _{Nov. 16} recommends saccharin as a means of rendering acid the alkaline urine of chronic suppurative cystitis. Pichi is recommended by Nash ²⁰² _{Jan. 25} in the same class of cases; as, too, is Pareira brava by McNulty. ⁷² _{June 25} The use of dry heat, applied by using a hollow double bougie, through which passes hot water, guarded throughout the urethral length, is recommended by Hoyt ¹³² _{Sept.} in cystitis in the female. It is claimed that marked improvement follows almost immediately, the pelvic congestion, weight, and soreness being readily relieved, a better circulation being established in the vesical walls and pelvic organs generally. The complete cure of a case of cystitis of five years' standing in a girl aged 11 years, by the employment of

balsam of copaiba, is reported by McMechan.¹⁵¹ Palmer²⁴⁵ Sept. 26 commends highly the use of corrosive-sublimate solution, as weak as 1 to 30,000, in the treatment of gonorrhœa and gonorrhœal cystitis. Hot irrigations of from 30 to 60 fluidounces (930 to 1860 grammes) of the solution, gradually increasing the strength from day to day, are employed twice a day where practicable, the average cure of all cases occurring in six to seven weeks.

Where there is paresis or any insufficiency of the detrusor muscle, leading to the presence of residual urine in the bladder, Heddaeus⁴ ⁶⁰ No. 45, '88; Apr. 6 advises the following method of manual evacuation: The patient lying upon his back, his thighs flexed, the physician faces the patient, the thumbs being brought over the symphysis, the fingers placed over the upper portion of the bladder and downward pressure employed; or the physician may face away from the patient, placing the ulnar borders of the hands along Poupart's ligament and produce downward pressure by the thumbs. The method should not be used where the retention is from obstruction or is very marked, or where inflammatory conditions prevail, lest rupture of the viscus result. Chico⁴ Jan. 21 claims priority in the practice of this method for the late Francisco Bassetti, of the medical faculty of Mexico, the latter having performed and taught it as early as 1874. Madden,² Mar. 5 as a rapid curative method for cystitis in women, recommends operative procedure where every ordinary course has been clearly eliminated. He does not advise the formation of a vesico-vaginal fistula (Emmet and Sims), but urges the dilatation of the urethra and the swabbing of the surface of the vesical and urethral mucous membrane with a glycerole of carbolic acid, repeated several times at intervals of a week. Bazy³ June 26 recommends in these cases, when far advanced, particularly where the surface is encrusted with lime-salts, the scraping of the mucous surface with the blade of a lithotrite, and then washing or mopping the surface with some mild antiseptic solution, as of boric acid. Following Maguire, Foy²² July 24 recommends, in cases of advanced cystitis with ammoniacal urine, that suprapubic cystotomy be performed with a view of providing a means of washing the bladder with antiseptic solutions,—a practice also commended by Fehleisen.⁴ June 24 A case in which this proceeding was successfully carried out is reported by Davis.⁶¹⁷ Belin¹⁷⁵ Apr. advises for the same object ordinary tapping of the bladder, washing out the

viscus through the cannula. In the cases of alkaline fermentation Smith ⁵⁹ _{Nov. 16} suggests the internal administration of saccharine as a means of acidifying and as an antiseptic, the drug being eliminated almost entirely by the kidneys.

TUMORS OF THE BLADDER.

Vincent ¹⁸⁵ _{May} describes a cyst removed from the posterior wall of the bladder of a girl of 9 years. It was pediculated and about the size of a walnut, and apparently grew from the glandular structures encountered about the neck of the viscus. Fenwick ² _{July 6, 20} believes that by the use of the electric endoscope a precancerous condition of the vesical membrane may be recognized, in which the surface is somewhat blurred, lumpy, and gelatinous, and most frequently seen between the ureteral openings,—the usual seat of cancer. Paul ¹⁸⁷ _{Jan.} mentions a case of cancer of the bladder of a male, aged 39 years, which, upon section, was to all appearances a myxo-sarcoma; careful examination of the growth in other parts decided its cancerous nature. Sym ³⁶ _{Jan.} reports a case of a large cancerous growth of the posterior wall of the bladder, not invading the ureters of the neck of the viscus, occurring in a woman aged 73 years. Four years previously haematuria was present, and some months prior to the death she had a large amount of papillomatous material removed with temporary relief. There were no secondary growths. Stokes ¹⁶ _{Jan.} reports the death of a case from cancer of the bladder three years after the removal of several papillomatous tumors from her bladder, which were regarded as benign. Cabot, ¹ _{June 15} failing to catch a suspected stone in the lithotrite after repeated attempts, performed supra-pubic cystotomy, cutting into a large, hard tumor-mass immediately over the pelvic arch. The wound was closed and healed, but death followed within a year. A large scirrhus of the bladder was found, a portion of which, projecting into the viscus, was encrusted with salts, and gave the impression of stone. Another growth, from examination a scirrhouss cancer, is reported by Southam ⁹⁰ _{July} as occurring in the bladder of a male aged 66 years. The growth scarcely invaded the bladder-cavity, but grew in the thickened bladder-walls, with little ulcerative tendency. Because of this, haematuria was absent until within a few days of death, and the other symptoms were likewise postponed. The growth apparently was primarily from the

bladder, but invaded the cellular tissue between the bladder and rectum, the prostate, and the tissue about the base of the bladder.

Lamarque,¹⁸⁸ _{Apr. 21} exhibiting the bladder of a chronic cystitis case, a man aged 55 years, a hemiplegic with urinary retention, called attention to the existence, besides the usual appearances of chronic cystitis, of numerous small papillomata visible beneath a layer of lymph, probably of recent origin, inasmuch as haematuria was a recent symptom. The scattered distribution of these growths was also somewhat anomalous. Cabot,¹ _{June 15} mentions a case illustrating a possible error in diagnosis. The case was one of severe cystitis, with erosion of the vesical membrane over the prostate, laying bare the proliferating gland-acini. Some of these, becoming separated, were found in the urine and mistaken for the villi of a papillomatous growth.

Englisch²⁸² _{Nov. 12} has collected 23 cases of idiopathic pericystitis of the cavity of Retzius, 18 men and 5 women. Early life, between 8 and 30 years, seems especially liable to the occurrence; perhaps tuberculosis should be looked upon as a predisposing condition. At any rate, any existing or previous attack of cystitis is highly predisposing. The usual local symptoms are vesical pain and tumefaction, appearing above the symphysis and sometimes reaching the umbilicus. The inflammation may disappear spontaneously or go on to sclerotic changes or suppuration; the diagnosis is especially liable to be confused with that of local peritonitis, cystitis, or abdominal myositis. The vast majority recover, if properly cared for, the treatment involving no special features from that of other inflammations.

CALCULOUS DISEASE.

In an elaborate study of calculous formation in the prostate, Posner¹¹⁴ _{1916, H. 1, 2} states that these concretions so frequent in old men are, in a certain sense, allied to starch of the vegetable kingdom and to ordinary amyloid material, but present essential differences. They are, further, composed of crystalline elements, as of lecithin, and may form within a crypt by degeneration of its retained secretion, or may be caused by a degeneration of a mass of cells.

Bruce²⁸⁴ _{July} states, as his opinion of the formation of urinary calculi, that a chronic or subacute catarrh is necessary, the perverted viscid secretion resulting acting as a means of agglutinating the crystalline elements. Ebstein and Nicolaier¹¹³ _{June 2} have produced

renal calculi by feeding to dogs oxamid (an oxalic derivative of ammonia). The largest stones were always in the renal pelvis, but small ones were frequently scattered through the renal structure. The oxamid was found to form these calculi and could be dissolved from them, leaving behind an organic skeleton. The calculi had the usual concentric layer, and were of a greenish color, the oxamid having taken up a urinary pigment. An enormous calculus from the renal pelvis of a woman at autopsy is reported.²⁸² It weighed 180 grammes ($5\frac{3}{4}$ ounces), was large and branched; the kidney was also quite large, the entire weight of organ and calculus being $3\frac{1}{4}$ pounds (about 2 kilos). A large vesical calculus is mentioned by Duret,²²⁰ removed from the bladder of a child aged 6 years; the weight was 60 grammes (2 ounces), the stone being of the size of a mandarin, smooth, with a centre of brown surrounded by concentric layers of white. Box²³⁰ reports a case of oxalic calculus passed after several attacks of colic, not of the usual mulberry form, but crystalline, built upon the combination of two large octahedrals. Wied²_{Feb. 23} demonstrated the left kidney of a man, aged 43 years, who had never suffered any symptoms of renal calculi. The organ was filled with several large arborescent calculi; the ureter was plugged by a large stone, and practically no secreting tissue was uninvaded by the stones or the results of degeneration due to their presence. Billings¹¹⁵ reports a case of nephrotomy, 8 calculi being removed and a small amount of pus washed from the wound. The patient died, and upon examination the opposite kidney was found to contain a large number of calculi also, but little secreting tissue remaining. Chiene³⁶ demonstrated several vesical calculi, removed, 1 from a boy of $4\frac{1}{2}$ years, 2 from men aged 52 and 60, respectively, and the last from a woman, the result of the encrustation of a foreign substance introduced into the urethra. Davis¹⁸⁶_{July} and Flint¹_{Feb. 16} both call attention to the fact that the passage of very small concretions may cause intense renal colic, quoting cases and presenting specimens illustrating their remarks. Potain¹⁷⁷_{Apr. 29} reports a case of left-sided renal colic, in which there were present a number of peculiar unilateral symptoms, in a young woman aged 22 years. There was marked diminution in cutaneous sensibility, and, upon the left side, the olfactory. Visual and auditory functions were disturbed. Pousson,¹⁸⁸_{May 10, 26} considering the anuria from calculi,

recalls the conditions of such anuria. It may occur from obstruction where there is but a single kidney, or by simultaneous double obstruction; where the obstruction is unilateral, but the fellow-kidney in advanced state of change, anuria may be almost complete. Not infrequently a unilateral obstruction is accompanied by a reflex inhibition of the function of the unobstructed kidney. Keen¹ _{May 20} reports a case of nephrotomy for calculus, in which, upon incision, a large sarcoma was discovered, full of calcareous patches, which had caused the sensation of stone upon exploratory puncture. Caillé⁵⁹ _{Feb. 2} refers to a case of renal colic with retention of urine in which catheterization was performed, slowly at first and then rapidly, with the effect of causing the passage of the stone into the bladder, the sudden relaxation of the ureter-walls permitting its movement. In the passage of renal calculi into the bladder, Murray²⁶ _{Oct.} recommends the administration of belladonna until toxic symptoms are manifested as materially aiding in the relief of pain and in expulsion of the stone. Waugh⁶² _{April} recommends salol as an anodyne in the same cases; infusion of garden-bean blossoms is recommended⁶⁷ _{Mar. 15} in these cases as a popular remedy of value in the south of France, especially useful in the solution of lithic-acid calculi. Huchard⁶² _{Feb. 15} commends the use of antipyrin in these cases, not only as an anodyne but also as having a direct solvent action upon the calculi. As a means of prevention of renal calculi, Roberts¹¹⁷ _{Sept.} recommends, as preferable among the antacids, the use of the citrate of potassium, or the bicarbonate or acetate. Dabieszewski²⁴ _{Apr. 25} recommends highly the use of Rudolphsquelle, Marienbad, and Kreuzebrunne waters in the treatment of renal gravel. Adams¹³⁹ _{Nov.} calls attention to the value of the water of the Arkansas lithia-springs as a solvent.

ENURESIS.

Oserezkowski⁷⁵ _{Apr. 1} has analyzed 40 cases of urinary incontinence among the soldiers in the military hospitals of Moscow, and states that in the majority of these cases there existed anaesthesia of the mucous membrane of the bladder and urethra, and in some anaesthesia extended over considerable areas of the body. In 10 cases there was a history pointing to heredity. Peyer⁵⁷ _{June 10} records a case occurring in a boy of 10 years, following attacks of *petit mal*, which were apparently induced by excessive masturbation. In a case published by Gersuny,³³⁶ _{No. 25} the patient, when a girl of 13, had been

operated upon for epispadias, and the co-existent incontinence disappeared for a time. Six years later she presented herself again, able to retain her urine when sitting, but in moving about unable to prevent its dribbling. Gersuny made a successful effort to overcome the trouble by performing a plastic operation by which the urethra slightly twisted ($1\frac{1}{4}$ times, or 450°) lineally, a position in which the constricting fibres could act with special effect. In regarding the treatment of nocturnal incontinence, Baruch,⁵¹ in *May* is not inclined to look upon operative measures with favor, but has found that if atropia be administered to its physiological effect, the vast majority of cases will respond, and most be permanently cured. Watson,⁵¹ in *Oct.* in 30 cases treated in this manner, succeeded in permanently overcoming the affection in 23, thus completely confirming Baruch. Gleason¹⁹² in *Jan.* records 3 cases of children in whom *rhus toxicodendron* proved of marked benefit in this affection. Deseroizilles,³⁵ in *May 11, 18* recording his experiences with *rhus aromaticus* in this affection, regards its action as similar to that of strychnia, and mentions 6 cases, in 3 of which beneficial results followed the administration of the drug, one being permanently cured. Guinon,²¹² in his inaugural thesis, recommends strychnia in the form of a syrup, using gradually increasing doses. Walters¹⁸⁶ in *Feb.* recommends the use of *pulsatilla* in this affection. Both Richards² in *June 22* and Black² in *June 29* advises the use of a combination of *potassium bromide* and *belladonna* in the treatment of nocturnal incontinence, the latter substituting *mono-bromide of camphor* where *potassium bromide* should be withheld. Antipyrin is suggested by Perret¹⁵² in *July 4; Oct. 12* (and Devie) in the treatment of enuresis nocturna, giving to children of 5 or 8 years from 1 to 2 grammes (15 to 31 grains) in two doses in the evening, one dose about 7 and the second at 9 o'clock. The treatment should be continued for a week, and followed by a week's intermission. Picard,²¹ in *June 30; July 21* in the treatment of a boy of 13 years, the child of a healthy father but of a nervous mother, in excellent health, but afflicted with nocturnal enuresis since birth, succeeded in curing by the use of the induced current, applied twice a week, one pole in the membranous portion of the urethra, the other in the hypogastrium. No benefit was noted until after six weeks of treatment, when periods of remission, of increasing frequency and duration, set in and persisted until complete recovery. A similar case in a young female aged 15 years was similarly treated by Jamin²⁶⁶ in *June 1; Aug. 24* with excellent

results. In girls, because of the difference in anatomy, the urethral electrode should be applied to the entire urethra, not entering the bladder or getting outside the meatus. Jamin employs the negative pole in the urethra and the positive not to the hypogastrium or loins, but to the thigh, in order to escape as much as possible any action upon the bladder. As a stimulant to the urethra, Clark ¹⁷ _{Dec. 27, '88; Mar. 16} ⁵⁹ recommends the use of the sound in incontinent children, taking care at no time to actually dilate the urethra.

DISEASES OF THE ADRENALS.

Jaccoud ¹⁷ _{Dec. 27, '88} looks upon Addison's disease as not dependent upon any disease of the adrenals *per se*, but to the involvement of important nervous elements about and in them, going to produce the cardiac, pulmonary, and gastric symptoms through the connection of these structures with the pneumogastric nerve. No one disease of the adrenals is necessary to cause these changes, but tuberculosis is most often met. Baumie ⁷⁰ _{Feb. 11, '88; Apr. 1} ⁶ suggests that there exists in the adrenals a chromatic nervous apparatus, the function of which is to supply the pigment material of the body in the form of the chemical body described by Vulpian. This substance, which reddens in air and becomes black with the persalts of iron, would, after contributing to the formation of hæmoglobin, go to form pigment in the cellular elements.

A case of Addison's disease is described by Kallendro and Babes, ³ _{Feb. 22; May} ²⁶ in which the typical changes were encountered, and in which upon careful examination there was found a chronic spinal sclerosis of the posterior root-zones, together with a neuritis attacking especially the posterior roots of the spinal nerves. This neuritis, especially seen about the annular constrictions, is marked by a swelling of the axis-cylinders, their rupture at places, and a multiplication of cells. These features were most prominent in the lower portion of the cord.

Lehfrédt ³ _{May 8} reports a case occurring in a young man aged 18 years, pigmentation and the ordinary symptoms being present. Upon post-mortem examination the adrenals were found in a cheesy condition. There was upon the neck a scar left by an operation some years before upon a node of lupus, and general tuberculosis was marked. Rake ⁶ _{Aug. 3} reports a case of a leper, aged 55 years, a Hindu, manifesting the results of syphilis in various parts of the

body, in whom, upon post-mortem examination, the adrenals were found converted into sacs containing a brownish *débris*, with small, yellowish, tubercle-like masses mingled. The ganglionic structure over the aorta was enlarged and dark red in color. No bacilli could be demonstrated. There was difficulty in determining pigmentation on account of the natural color of the skin, but it could be noted increased about the mouth and upon some of the serous surfaces. Typical cases of Addison's disease, marked pigmentation being present, are mentioned by Watson, ⁵⁹ July 13 Sjöström, ⁶⁹ May 30 Gade ^{3/49} Jan. 1 (reported by Eklund, corresponding editor), Hodenpyle, ¹ Jan. 19 Suckling, ² Feb. 16 and Baumel. ⁷⁰ No. 11, '88 In Sjöström's case the adrenals alone were tubercular, and the bacilli could be detected in their structure. This author, in studying the pigmentation, finds the pigment-matter mostly deposited in the protoplasm of the cells of the rete at those points where pigment is usual in our race. In the case mentioned by Gade there was considerable involvement of the adjacent nerve-ganglia. In Watson's case there was no adrenal caseation, the organs being enlarged and inflamed, however. Garrett ⁹ Jan. 26 mentions a typical case occurring in a young man of athletic build, excellent family history, being preceded by an attack of typhlitis which may have been tubercular. The adrenals were in a state of caseation.

Willett ² Mar. 2 mentions a case, occurring in a man aged 59 years, with pulmonary tubercular involvement, in whom the pigmentation was present about four months before death, and later disappeared, death occurring suddenly. Northrup ⁵⁹ Mar. 16 demonstrated the adrenals of a female infant aged 8 days. The right one was increased in size, its middle third being dark and congested. The left one was not much altered in size, but was the seat of an irregular haemorrhage and largely caseated. The skin was somewhat mottled and of a yellowish-brown color. A case of probable Addison's disease, occurring together with Graves' disease, is reported by Eulenberg, ⁴ No. 1; May 15 the diagnosis of the first condition resting upon a steady emaciation and the presence of a peculiar dirty-blue hue of the skin and mucous membranes. Later, the case improved; the woman became pregnant and the improvement appeared permanent. A case is reported from the Montreal General Hospital, ²⁸² Mar. occurring in a well-built blacksmith, aged 32 years, with an excellent family history, and with no symptoms of any tubercular invasion save those of his adrenal disease. Caverhill ³⁶ Aug.

reports a case of marked bronzing occurring in a patient, apparently non-tubercular, in whom there was a history of severe wrenching of the body while skating. The patient noticed no special weakness, had no other symptoms than the bronzing, and was gaining in weight. M'Iachlan² Jan. 12 mentions a case, aged 37 years, in whom there had been pigmentation since 1880. During this period he had procreated, a healthy child resulting. When reported, however, progressing asthenia had made its appearance.

The following cases are reported as failing in the symptoms of bronzing, all of the above having been pigmented: Virchow⁴ Apr. 29 reports a case of caseation of both adrenals, a man aged 39 years, afflicted with pulmonary phthisis, in whom no pigmentation occurred. He also mentioned a case of similar change of the adrenals, without bronzing, in a man aged 42 years. In this case the previous existence of syphilis made it possible that the change was not tubercular. Lamarque¹⁸⁸ May 5 demonstrated the specimens from a woman in whom the left kidney and supra-renal body were sclerosed and the seat of tubercular, cheesy nodules, no pigmentation having been noticed during life. West² Nov. 9 reports the case of a diabetic, aged 49 years, in whom the supra-renals were found in an advanced fibrous change at post-mortem, no pigmentation having ever been marked. In another case, reported by the same writer, the one capsule was found in a cystic condition, the patient having died from phthisis without manifesting adrenal disease. Primary sarcoma involving both adrenals, without producing pigmentary symptoms, is reported by Perry.² Oct. 21 Griffiths² Feb. 5 mentions 2 cases, one of sarcoma of both adrenals in a sailor aged 41 years, failing in pigmentary symptoms; the other, the occurrence of gummata in the right adrenal of a sailor aged 40 years, without bronzing. Berdach⁸⁴ Nos. 10, 11; July 6 describes a case of sarcoma of the left adrenal of a man aged 55 years. There were secondary deposits in the liver; there was no bronzing, but subnormal temperature; intense pain radiating from the left hypochondrium led to the diagnosis of the true condition. Pilliet⁷ Mar., No. 17 reports 3 cases of adenomata, discovered post-mortem, in the adrenals of patients dying of causes other than Addison's disease. These adenomata vary in size to that of a hazel-nut, are usually found in the cortex, tend to undergo fatty degeneration, caseation, and to be the seat of haemorrhagic change; they are probably, in part at least, due to sclerotic changes of the organ, as in case of adenoma of the kidney.

FEVERS.

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GENERAL PATHOLOGY OF FEVER.

THE interest in this field of pathology and clinical medicine is unabated. We note from year to year not only a larger place in current literature, but greater definiteness of statement and accuracy of description in the communications. Enteric fever, the great fever of the present historical epoch, receives peculiar attention and occupies the larger part of the space. Valuable papers upon the prophylaxis of this disease have appeared during the past year. Whilst it cannot be said that there is much that is really new in regard to treatment, the activity shown in the study and comparison of different forms of treatment is yielding good results. The hope may be entertained that the methods that are really hurtful will gradually fall out of use, and that the time is not far distant when the profession at large will be able to agree upon the relative value of the expectant, the expectant-symptomatic, the antiseptic, and the antipyretic plans. The other fevers receive due attention. The question as to whether or not the collection of symptoms known as Weil's disease constitutes a pathological entity seems in a fair way of early settlement. The unusually large number of papers relating to irregular febrile diseases hitherto undescribed, which appeared toward the end of the year, is probably in some part due to the fact that the true nature of the earlier cases of epidemic influenza was not in all instances recognized.

Ott's experiments, briefly referred to in the ANNUAL of last year, have appeared in full.²⁴² They were made upon rabbits and cats, and putrid blood was the pyrogenic material selected. The animals were deprived of food twelve hours before the observations

were started. As a rule, the experimental fever was accompanied by increased heat production. Exceptionally, production was decreased. Both heat production and heat dissipation may be below normal and yet increased temperature be manifested. High temperature is an indication of danger in specific fever not the cause of it. Temperature is only a part of a specific fever. There are many other morbid processes going on, the essence of which has not been grasped. Subnormal temperature in typhoid patients, for example, is due, like elevation of temperature, to disorder of thermotaxic centres.

Dochmann⁸⁴ Mar. 30 believes that the rise of body-temperature in infectious diseases is a manifestation of the *vis medicatrix naturæ*. When cats that had been poisoned with curare were placed in the heating apparatus and subjected to an artificial elevation of temperature, they quickly recovered from the intoxication, which was not the case with other animals used for control experiments. Similar results were obtained in animals injected with putrid substances.

Roussy¹⁰⁰ Feb. 14, Mar. 14 has made some experimental and clinical researches upon the pathogenesis of fever and upon certain calorogenic and frigogenic substances of microbian origin, which he has named "pyretogenine" and "frigogenine." His investigations have extended over more than three years and embrace more than 400 varied experiments. The following conclusions may be cited: Subcutaneous and intra-venous injections of stale beer, of macerations of hay, of tainted meat, etc., always determine fever in dogs and rabbits. The intensity and rapidity which characterizes the fever indicate that it is due more to soluble chemical substances than to the mechanical actions of micro-organisms contained in the injected liquids. Intra-stomachal injections produced but little fever in rabbits, and are without effect upon dogs, indicating that the soluble chemical substances are modified or destroyed in the intestines, or in the organs they must traverse to enter the system, and possibly, in dogs, may not be absorbed at all. Concerning pyrogenine, the most active of the fever-producing agents experimented with, which is extracted from solutions containing spores of the yeast-plant, the author considers that it is not alone a base exclusively organic, but that it is itself a diastase of considerable energy. An infinitesimal quantity will rapidly convert a relatively

enormous quantity of starchy material into sugar. Roussy is inclined to make a generalization that all cellules—that is, all micro-organisms, or, in one word, all the biological units—elaborate diastases, or soluble ferments, which serve to attack and transform all organic materials with which they are brought in contact. He would thus explain the probable origin and course of infectious diseases, especially of fevers.

Hanau^{15, 16} contributes a thoughtful and suggestive paper on "The Theory of Recovery and Immunity from Infective Diseases." He opposes the doctrine of phagocytes, and denies the similarity of immunity and recovery. In this connection he cites the phenomena of recurrent erysipelas, the malarial cachexia, relapsing fever, gonorrhœa, and syphilis. In the latter, so far from recovery and immunity being allied processes, renewed vulnerability is considered the best evidence of recovery. The different phases of disease, including recovery, he looks upon as intimately related with different periods in the development of the specific microbe. Recovery may take place independently of the death of the invading organism in two ways: First, it may be due to the transformation of the parasite into an innocuous form, as in the case of encapsulated trichinæ. The death of the host is simply an intercurrent accident preventing the full development of the pathogenic organism. Second, the pathogenic organism may be expelled from the body, as in the recognized cases of spontaneous evacuation of an abscess. Another method of elimination is the gradual epithelial exfoliation which occurs in catarrhal inflammations. The whole phenomena of disease, recovery, and immunity are due to action and reaction between the parasite and the tissues of the host. On each side it may lead to certain morphological or biological transformations.

PREVENTION OF FEVERS.

Welch,⁵⁹ in his address on State medicine before the American Medical Association, considers some external sources of infection in their bearing upon preventive medicine. Many infectious agents are transported by the air, but the extent of danger from this source has often been exaggerated. A fact of capital importance in understanding the relation of bacteria to the air is the impossibility of currents of air detaching bacteria from moist surfaces.

Substances containing pathogenic bacteria, as, for instance, sputa containing tubercle bacilli or excreta holding typhoid bacilli, cannot affect the air unless these substances first become dry and are converted into a fine powder.

The only pathogenic bacteria which have heretofore been found in the air are the pus-organisms, including the streptococcus found by Prudden in a series of cases of diphtheria and tubercle bacilli; but the evidence in other ways is conclusive that many infectious agents—and here the malarial germ should be prominently mentioned—can be, and often are, conveyed by the air. Such germs may be deposited on substances with which we readily come into contact, or they may fall on articles of food, where they may find conditions suitable for their reproduction. The practical conclusions are: the necessity of guarding, so far as practicable, against the desiccation, when exposed to the air, of substances which contain infectious germs not destroyed by drying, and the equal necessity of free ventilation.

Welch protests against placing reliance upon any method heretofore employed for disinfecting houses or apartments by fumigation, and calls attention to the lack in most cities in this country of public disinfecting establishments such as are in use in most cities in Europe, and which are indispensable for the thorough and convenient disinfection of clothing, bedding, carpets, etc.

That the prevalence of many infectious diseases depends upon conditions appertaining to the soil he believes cannot be questioned. The ground, unlike the air, is the resting or the breeding place of a vast number of species of micro-organisms, including some which are pathogenic. Among the pathogenic bacteria which have their natural home in the soil, the most widely distributed are the bacilli of malignant œdema and those of tetanus. He found some garden-earth in Baltimore extremely rich in tetanus bacilli. In infected localities the anthrax bacillus and, in two instances, the typhoid bacillus, so far as it was possible to identify it, have been discovered in the earth.

Investigators are as yet unable, by the conclusions which may be drawn from observations of various authorities cited by Welch, to agree as to the earth being a good breeding place for most of the infectious bacteria with which we are acquainted. They seem to lean to the belief that it is not favorable to the propagation of

bacteria, but that it can contain for a long time, with unimpaired vitality, those which produce spores, or which offer considerable resistance to injurious agencies, such as anthrax bacilli, tubercle bacilli, and the pyogenic cocci. We may be brought into contact with infectious bacilli in the ground, either directly or by means of vegetables to which particles of earth are attached, by the infection of domestic animals, by the medium of flies or other insects, and by a variety of other ways more or less different. An important medium of transportation of bacteria from infected soil is drinking-water, or water used for domestic purposes. It is important to keep infectious substances as far as possible from the ground. This implies the early disinfection or destruction of such substances as typhoid and cholera excreta and tuberculous sputum.

The ground should be rendered, as far as practicable, unsuitable for the continued existence of infectious germs. This, at least, for some diseases, is accomplished by a proper system of drainage. Means should be provided to prevent waste products from getting into the ground around human habitations or from gaining access to water used for drinking or domestic purposes. In cities this can be accomplished only by a properly-constructed system of sewers. Finally, Welch states that in cities good pavements, absence of unnecessary disturbance of the soil, cleanliness of the streets, and laying of dust by sprinkling are not only conducive to comfort, but are sometimes hygienically important in preventing infection from the ground and dust.

Ordinary water contains bacteria in large numbers; not a few species can multiply rapidly even in distilled water. These are usually harmless saprophytes. Water is not a favorable breeding place for pathogenic bacteria, but it is not necessary that pathogenic bacteria should actually multiply in a medium to render it infectious; it is sufficient if their life and virulence are not destroyed in a very short time. In unsterilized water, kept at 105° C. (221° F.), the typhoid bacilli are demonstrable for seven days and the cholera bacteria for two days. In view of the fact that typhoid or cholera infection is not so often the result of throwing the stools of typhoid or cholera directly into the source of water-supply as it is the consequence of leaky drains, cess-pools, or infected soil, there is no sufficient reason, from a bacteriological point of view, for rejecting the transmissibility of typhoid fever and

cholera by the medium of drinking-water. Pathogenic bacteria may preserve their vitality longer in ice than in unsterilized drinking-water. Thus, Prudden found typhoid bacilli still alive which had been contained in ice for 163 days. The subsoil water, under ordinary circumstances, is germ-free; the surface water is exposed to all manner of infection from the ground, the air, and the direct admission of waste substances. Unfortunately, in the ordinary way of obtaining subsoil water for drinking purposes, by means of dug-wells, this distinction is obliterated, for the water which enters these wells free from bacteria is converted into a surface water often exposed, by the situation of the well, to more dangerous contamination than any other surface waters used for drinking purposes. We have, at present, no domestic filters which are satisfactory, and most of those in common use are worse than none, as they soon furnish a filtrate richer in bacteria than the original water. The only effective way of water filtration for the general supply is by means of large sand-filters, such as are in use with excellent results in Berlin and some other European cities. Neither chemical or bacteriological investigations can be relied upon exclusively, and both may prove inefficacious to demonstrate the infectiousness or non-infectiousness of a suspected source of water-supply. Many articles of food offer an excellent nutritive medium for the growth of a number of species of pathogenic micro-organisms. Fortunately, a large part of our food is sterilized in the process of cooking shortly before it is eaten, so that the danger of infection from this source is greatly diminished. Milk, in consequence of its extensive employment in an unsterilized state and of the excellent nutritive conditions which it presents to many pathogenic bacteria, should be emphasized as especially liable to carry certain kinds of infection. Not only the presence of infectious bacteria, but also that of bacteria capable of multiplication within the body, may give rise in milk and other kinds of food to various ptomaines, products of fermentation, and other injurious substances which, when ingested, are likely to cause more or less severe intoxication, or to render the alimentary tract more susceptible to the invasion and multiplication of genuinely infectious organisms.

Foote⁵ has experimented on the sterilization of faeces. His conclusions are that the best disinfectants to use are the bichloride of mercury with hydrochloric acid, the bichloride of mercury with

potassium permanganate, and the chloride of lime. Five-per-cent. solution of carbolic acid and $\frac{2}{5}$ -per-cent. solutions of the bichloride are unreliable, even when used in the proportion of 1 pint ($\frac{1}{2}$ litre) to every 100 cubic centimetres (3.38 fluidounces) of dejection.

Emphasis needs to be laid on the necessity of thorough disintegration of the faecal matter by stirring with the disinfectant, and on the necessity of allowing the mixture to stand four hours, at least, before emptying. For continued use the bichloride solutions would injure lead pipe, while if used for a few days only probably no injury would result. For long-continued use, where the dejections are thrown into a water-closet, chloride of lime is the most available disinfectant. Solutions of chloride of lime should be kept tightly corked, and should not be used after they are one week old.

Sehrwald⁴,_{June 3} made some bacteriological experiments in Rossbach's laboratory, from which he draws the following conclusions: 1. Naphthalin retards but slowly, in the temperature of a room, the development of the bacilli of putrefaction of faeces and of typhoid. 2. Naphthalin, finely powdered and well spread, or in solution and continually shaken, has its disinfecting power increased. 3. In a temperature of 98° F. (36.66° C.) the effect of naphthalin is much more powerful, which makes it highly probable that it is chiefly in its gaseous state that it destroys the germs. 4. Gaseous naphthalin, in solution, has more effect on aërobic than on anaërobic bacilli, and more on germs cultivated in a solid medium than on those cultivated in liquid. 5. The conditions for the full effect of naphthalin are much more favorable in the intestines than in the test-glass. 6. Naphthalin added to faeces decreases their germs by about a half, but, administered internally, it first decreases them to one-third or even to a quarter; after this, however, their number rises again almost to its original figure. 7. Against the bacilli of typhoid stools naphthalin is considered still more effective, and decreases the number of germs even to one-tenth. 8. The administration of naphthalin should be commenced at the very beginning of typhoid fever. 9. As calomel affects some of the faecal bacilli, while others are more readily destroyed by naphthalin, it is best to give, whenever possible, both drugs combined.

Charrin and Ruffer³,_{Mar. 11} conducted a series of experiments to determine the influence of the nervous system in resisting infection. In animals in which they cut the sciatic nerve they found a

greater tendency to localized infection than where the nerve was left intact, and death occurred more readily. They had made but one experiment with the pneumogastric, but so far as this went it confirmed the others

GENERAL TREATMENT.

Spraying to Reduce Temperature.—Placzek²⁰ has made experimental observations upon animals and clinical studies upon fever patients with the method of reducing temperature by cold-water spraying advocated by Preyer and Flasher in 1884, and later employed by Hiller in the treatment of sun-stroke. He uses first a spray of cool water, about $1\frac{1}{2}$ pints (75 centimetres), and later 3 or 4 ounces (93 or 125 grammes) or more of warm water. In animals he succeeded in reducing temperature 2 degrees by this procedure, and in a phthisical patient, with a temperature of 104° F. (40° C.), reduced and for four hours kept it at normal. In place of the large quantity of water used in bathing, this requires only 1 litre (1 quart) three-fourths of a temperature between 15° to 18° C. (59° to 66° F.) and one-fourth of 40° C. (104° F.). The procedure lasts about twenty-five minutes, and can be repeated frequently.

Antipyretic Medication.—Joseph Jones, of New Orleans, La., collaborator,¹¹⁴⁸ considers that antipyrin, acetanilid, phenacetin, salol, and saccharin are destined to occupy a permanent position in therapeutics. An extreme degree of fever, with or without complications, is dangerous and must be controlled. In addition to the direct subtraction of heat by cold applications, we may, with due caution, have recourse to antipyretic remedies. Quinine is often to be preferred because of its undoubted action on some infective principles and its more lasting effects. A distinction must be drawn between fever and its pathogenic agent, for an antipyretic such as antipyrin or antifebrin may not act on this agent, and so may have an independent and therefore transitory action; or it may influence this agent, as quinine appears to do in some diseases.

Huet³⁴_{p.17} does not think that antipyretic measures are always necessary in the treatment of fevers, and believes, moreover, that the new agents, whose action is principally symptomatic, are not only inutile but often dangerous. Pel, of Amsterdam, Holland, corresponding editor, would not employ any antipyretic medicaments except those which at the same time exerted a specific influence upon the cause of the disease; for example, quinine in

malarial fever or salicylic acid in rheumatism. It is quite probable that fevers in many instances are a salutary reaction. When directly combated, especially by the new antipyretic remedies, alarming phenomena of collapse may ensue. In his criticism of antipyretic measures, however, he does not include cold baths. These may be regarded as stimulants to the nervous system. Rosenstein announces himself as a resolute partisan of antipyresis by means of cold water. He prefers, however, in the treatment of typhoid fever, cold sponging and bathing. Euphoria is favored by reduction of temperature in this manner.

Crombie¹⁵ has studied the comparative value of antipyrin, antifebrin, and phenacetin as antipyretics in the climate of India. He concludes that, as regards efficacy, antipyrin comes first, and that there is little to choose between antifebrin and phenacetin. As regards safety, the advantage lies with phenacetin. He has never known a subnormal temperature result from the use of that drug. As regards rapidity of action, antipyrin comes first, antifebrin second, phenacetin third. As regards duration of effect, the advantage lies with phenacetin. As regards certainty of action, he would quote them in the same order as rapidity, antipyrin, antifebrin, phenacetin. Phenacetin tablets are so hard as to be practically insoluble in the stomach. It should therefore be prescribed in lozenges, which are soft and friable. As regards inconvenience, in the climate of India phenacetin is followed by just as profuse sweating as either antipyrin or antifebrin. The use of these drugs does not in any way shorten an attack of fever. Enteric fever, simple continued fever, and remittent fever pursue their course unaffected; but there are a certain number of cases which have been brought to a sudden termination by the use of these drugs, namely, those in which there is a sudden attack of high fever after a chill or exposure to the sun. Crombie believes that temperature should always be kept below 103° F. (39.46° C.). This can be accomplished most safely by means of cold packing, but there are practical difficulties in carrying out such a practice which lead him to the use of antipyretics. On the whole, he believes, the choice lies between antifebrin and phenacetin, as antipyrin is liable to produce collapse. Phenacetin is probably the best, as it possesses a soothing and soporific effect not shared by the other antipyretics.

Penzoldt ³⁴ _{Aug. 20} considers the effect of the antipyretics upon the haemoglobin. He has not discovered any dangerous influence.

Hyperpyrexia in an Infant Treated with Cold Baths.—Adie ²⁰⁶ _{June} reports the case of a female infant, aged 18 days, admitted into the Eden Hospital with a rectal temperature of 110° F. (43.3° C.). The mother had had a rise of temperature on the evening of the day she was delivered, and the child's fever was first noticed the same time. The baby's skin was hot and red generally, the face a trifle pale, finger-tips and lips normal; the hands and fingers contracted, no twitching; mouth tightly closed; no opisthotonus. The heart-beats varied in rate from 130 to 180; sometimes could not be counted. Respirations were rapid, but not labored. No pulmonary lesion was detected. The abdomen was distended and somewhat tympanitic; liver and spleen not felt to be enlarged. Treatment consisted in keeping the heart going with stimulants and reducing the temperature with the graduated bath. In the first fifteen minutes after being placed in a bath at 89° F. (31.66° C.) the temperature fell to 108.8° F. (42.6° C.). In fifteen minutes more, the water being at 86° F. (30° C.), the fever had fallen to 100.6° F. (38.11° C.). It was intended to take the patient out when the temperature had fallen to 100° F. (37.77° C.) In three minutes, however, it suddenly fell from 100.6° to 97° F. (38.11° to 36.11° C.). The child was instantly taken out and dried. Friction over the whole body with Lin. Camph. Co. was instantly begun by four nurses. The temperature continued to fall, and reached 95.4° F. (35.22° C.), a fall of 14.6° F. (8.1° C.) in forty-five minutes. Heat was applied externally, brandy and milk were administered internally, and in the course of about an hour the temperature rose to 100.6° F. (38.11° C.). It continued rising, and reached 103.6° F. (39.77° C.), when the graduated bath was again employed, and temperature reduced to 99° F. (37.22° C.). It did not again rise above 100.2° F. (37.9° C.), varying usually between 98° and 100° F. (36.66° and 37.77° C.), and in six days the patient was discharged cured. No lung symptoms developed at any time. The cause of the hyperpyrexia is supposed to have been a fading tetanus.

ENTERIC FEVER (TYPHOID FEVER).

Etiology.—One of the most important papers of the year is that read by Vaughan ⁵⁹ _{July 12} before the American Medical Association.

The author has isolated from typhoid stools a ptomaine which, when administered to dogs, produced increase of temperature, vomiting, purging, with watery, mucous, and bloody stools. The research is not yet completed. The stools used were from three widely-separated outbreaks of the disease.

The "Fourth Annual Report of the State Board of Health of Maine" (1889) contains an admirable *résumé* of recent papers on the causation of enteric fever, especially with reference to its propagation by infected milk and water. Numerous valuable contributions on the same subject have been made in all portions of the world.

An outbreak of enteric fever at Balranald, N. S. W., is attributed to the water-supply. ⁶ Gebhart ²⁸³ _{Oct. 19 Nov. 37, 38} lays stress, in his report on enteric fever in Buda-Pesth, on the diffusion of this disease by drinking-water. Cameron ² _{Oct. 26} reports on a limited epidemic at Hendon traced to infected milk. The evidence as to how the milk became contaminated is not clear. Among other sources under suspicion is porcine pneumo-enteritis.

Charles V. Chapin ⁹⁹ _{June 20} reports on the epidemic of enteric fever in Providence, R. I., in its relation to the public water-supply. During the latter part of November, 1888, enteric fever began to increase quite rapidly and quite abruptly. The increase culminated December 1st, when 28 cases were reported, and the epidemic ceased, on December 12th, almost as suddenly as it began. There were 15 deaths in November, 47 in December, and 5 in January. The epidemic was confined to the city of Providence, and was pretty evenly distributed. It was found that typhoid had prevailed from August to December 1st at Natick, a village $3\frac{1}{4}$ miles (5 kilometres) above the pumping-station which supplies one of the reservoirs whence drinking-water is distributed to Providence. It had attacked some 20 persons living in tenements near the river. These people had been accustomed to throw slops and excrement on the banks of the stream, where they would be sure to wash in with a heavy rain, and might get in at other times. On November 9th and 10th there was a heavy rain. The city engineer calculates that three days might elapse between the time the infected water got into the pumps and the time it would reach consumers. Several filters were taken from houses where there was enteric fever and examined for bacilli. Two were examined by Prudden,

of New York, and typhoid bacilli found in one. Two were examined by Ernst, of Boston, and typhoid bacilli found in both. Two were examined by Swarts and typhoid bacilli found in neither. All observers found other organisms characteristic of human faeces. There can be little doubt that the epidemic described was due to infection by the public water-supply. What the author looks upon as a more frequent mode of infection is the following: The dried spores of the bacillus are carried here and there by the wind and other distributing agencies and take root in privy-vaults, cess-pools, swill-tubs, and other collections of decaying animal and vegetable matter. Some of these organisms find their way into the house and fall, perhaps, into the milk put in the cellar where it is cool, or upon cold potatoes on the pantry-shelf, only a few feet from an infected privy, or else, finding their way up the waste-pipe of a refrigerator which discharges upon the moist ground or into an open drain, multiply at leisure on the damp shelves, that are rarely washed or dried, and contaminate the food placed there. When this food is eaten without being cooked, the organisms sometimes escape the hostile action of the gastric juice and we have a case of enteric fever, which those who have paid little attention to bacteriology would quote as of *de novo* origin.

Anderson² _{Aug. 31} reports a peculiar teat eruption in a milch-cow coincident with an outbreak of enteric fever among the consumers of the milk at Dundee. The case for infection by this cow disease is not proved. An outbreak of enteric fever at Leeds has been provisionally traced to two farms from which milk is supplied to the families of those attacked. _{July 13}⁶

Milroy¹⁰⁶ _{Apr.} traces the connection between enteric fever and water-supply in Omaha, and advocates stringent sanitary legislation, together with the closing of all wells used as sources of portable water.

Cluzan²⁴³ _{Apr.} reviews the epidemic of enteric fever which suddenly broke out in September, 1887, among one company (10th Artillery) of the garrison of Vernon, in all 22 cases developing in the course of fifteen days, of which 1 proved fatal by lobar pneumonia contracted at the beginning of convalescence. Two other companies inhabiting the same barracks were free from the disease. The sanitary conditions of the quarters and the rations supplied to all were alike. The artillery company, however, were engaged dur-

ing the day at an arsenal, and there drank water not used by the others. This water came from a stream flowing through the village of St. Marcel, where at the time enteric fever existed. The villages had no other water, and not only used it for drinking purposes, but washed their linen therein. It is certain that linen soiled by persons sick of enteric fever was washed in this brook. In 1883 enteric fever similarly appeared at Vernon, following an outbreak at St. Marcel, when the brook was abandoned as a water-supply, and water taken at the source brought in subterranean conduits, since which no cases of local origin had been seen there.

Passerat ^{June 23}²¹¹ has carefully studied the epidemic of enteric fever which prevailed at Bourge-en-Bresse from November 29, 1888, to February 20, 1889. The bacillus of Eberth, which Chantemesse had failed to find in samples previously submitted to him, was later isolated and cultivated by Vaillard at Val de Grace, and its presence in the water of the Lent, the water distributed by the municipality throughout the town, thus proved beyond question. The water of the locality, on the other hand, was free from bacilli. Enteric fever was entirely absent from the charitable and educational establishments using the water of the locality, while at least 40 cases occurred in those establishments using the water of the Lent. Enteric fever had been a rare phenomenon in this place. During 1888, however, a number of sporadic cases had occurred, as if to warn them of the pollution of the water-supply and of the imminence of an epidemic. The epidemic exhibited three divisions. The first and most important was from the end of November to the 19th of December. The second, from January 1st to 15th. The last, quite mild, from February 15th to 20th. An interval of ten days, during which no new case was observed, separated the first outbreak from the second. One month elapsed between the second and third. The water of the Lent was distributed eight days before the outbreak of the first epidemic; again, December 25th to 27th, one week before the second outbreak; again, on the 14th of February, a mild disturbance was followed by 5 new cases. Passerat has collected 81 cases, somewhat less than the actual number. Of these 65 belonged to the first outbreak, 10 to the second, and 5 to the third. Fifty-four cases occurred among the civic population, 27 among the soldiers. Eight deaths occurred, 3 among the resident population and 5 among the floating population.

Shufelt⁵⁹ _{Jan. 26} holds (1) that the poison spreads with greater rapidity and becomes more virulent in proportion to the amount of organic matter in the water and the soil; (2) that when the water-supply is infected with the poison, most of those drinking it suffer to a greater or less extent, though all may not develop the characteristic symptoms; (3) it is of the greatest importance that the disease should be recognized at its earliest stage, the source of the poison located, and both milk and water sterilized before being used. In support of these propositions, he instances three local epidemics, two of which occurred in Lower Canada and one at Bath Beach, L. I.

Hope, Assistant Medical Officer of Health at Liverpool,¹⁸⁷ _{July} reports on some features of the local incidence of enteric fever. It has never prevailed in that city to any serious epidemic degree, yet it is nearly always present, and the deaths for the last ten years have averaged 129 annually. Liverpool, at the present day, may be regarded as a well-sewered city. In all new houses the laws provide for the efficient trapping off of the house-drain from the sewer and for appropriate ventilation. The "court-houses," some 12,000 in number, have no further internal drainage than that necessary for the removal of water used for domestic purposes, the closets being outside and flushed daily by scavengers. The courts produce their full quota of enteric fever. A number of instances of local outbreaks, traced to defective plumbing, are quoted; 3 series of cases are given, however, in which the sanitary condition of the house, after the most careful examination, was found to be perfectly satisfactory, and in which 1 case seems in each instance to have given rise to several others.

Von Pettenkofer¹¹⁴⁹ _{Mar. 6}²² has traced the history of typhoid fever in Munich, during the period from 1851 to 1887, showing the relation of its frequency with the sanitary condition of the city at the various stages of progress. During the years 1858 to 1880 there was a gradual diminution of disease in Echelon; that is to say that, although since 1857 there have been several epidemics of the disease, the epidemic of 1869 was a great improvement on that of 1857, and that of 1873 on that of 1869, and so on; so that it would appear that there was some influence for good at work from the first-mentioned date. He first of all gave statistics showing, among other things, the mortality per 100,000 of in-

habitants each year from typhoid. The figures are so eloquent that we cannot refrain from giving a few. These are:—

1851.	.	.	.	.	.	99	1870.	.	.	.	.	.	149
1852.	.	.	.	.	.	121	1871.	.	.	.	.	.	129
1853.	.	.	.	.	.	184	1872.	.	.	.	.	.	240
1854.	.	.	.	.	.	227	1873.	.	.	.	.	.	131
1855.	.	.	.	.	.	193	1874.	.	.	.	.	.	159
1856.	.	.	.	.	.	291	1875.	.	.	.	.	.	121
1857.	.	.	.	.	.	291	1876.	.	.	.	.	.	67
1858.	.	.	.	.	.	334	1877.	.	.	.	.	.	84
1859.	.	.	.	.	.	175	1878.	.	.	.	.	.	55
1860.	.	.	.	.	.	109	1879.	.	.	.	.	.	109
1861.	.	.	.	.	.	119	1880.	.	.	.	.	.	72
1862.	.	.	.	.	.	202	1881.	.	.	.	.	.	18
1863.	.	.	.	.	.	163	1882.	.	.	.	.	.	18
1864.	.	.	.	.	.	247	1883.	.	.	.	.	.	19
1865.	.	.	.	.	.	202	1884.	.	.	.	.	.	14
1866.	.	.	.	.	.	203	1885.	.	.	.	.	.	18
1867.	.	.	.	.	.	52	1886.	.	.	.	.	.	21
1868.	.	.	.	.	.	80	1887.	.	.	.	.	.	10
1869.	.	.	.	.	.	111							

From the mortality he estimates, by a simple and apparently reliable process, the morbidity and the loss to the community at large resulting from a preventible disease. He then goes on to consider the etiology, to which a considerable space is devoted, the various sanitary improvements that have been carried out, and to estimate the share of each in bringing about the desirable result that has been obtained. Respecting the drinking-water theory, he says that it is still the ruling one; that it is the nearest at hand; the simplest, the most easily understood, both by the laity and physicians; that it never leaves one in the lurch, for if there is no epidemic no germs have got into the drinking-water, and if one breaks out they have got in. Although the drinking-water theory does not satisfy him, as we shall see further on, he acknowledges that it has been productive of much good to the brewers, as people have been afraid to drink water, and have drunk beer to the value of 30 millions of marks per annum. He then gives the history of the introduction of pure water to the city, showing that the various parts got their supply at various times, and that absolutely no correspondence was shown between the date of supply and the diminution in frequency of the disease. Until 1865 the water-supply of Munich was exactly what it was in the cholera year, 1854, and scores of years before. In 1865 the Pettenkofer Brun-

nenhaus water was added, but this was not a general but only an increased supply to certain parts of the city, and the full supply of pure water was only instituted in 1883, some years, as will be seen by the table, after the great decline in typhoid fever had declared itself. The effect of improved methods of treatment and possible change of constitution among the inhabitants and the "saturation" theory come under review, but all are rejected as inconclusive and unsatisfactory. "After," he says, "I have discussed the things from which the decline of typhoid fever in Munich cannot come, it remains for me to speak of that from which, in my opinion, it really does arise. If epidemics do not arise from the individual cases, and not from the drinking-water into which the germs of disease may have found their way from the sick, Munich itself must be the breeding place. Typhoid, as well as cholera, not less than malaria or intermittent fever, shows a connection with locality and seasons, and as something can be accomplished as regards the frequency and severity of malaria by treating the soil itself, so also with cholera and typhoid." The soil of Munich is very porous, and the pollution of the soil of a city comes principally from human excrement and middens.

In 1854 it was ordered by the authorities of the city that in the case of all new erections the middens should be made water-tight, and that existing middens should also be made water-tight or done away with before the year 1860. Before this time middens were simply pits from which the fluid contents were absorbed by the soil. Many householders did not see the utility of spending money on making them water-tight. An otherwise intelligent man complained bitterly in von Pettenkofer's hearing on being obliged to make such changes. He had built a new house and had fulfilled the requirements of the law. Now, however, he had to put a similar arrangement into an old house, and yet the old midden was much better than that in the new one. The midden in the new house was running over in a couple of months and had to be cleaned out, whilst the old one had not required cleaning out for twenty years! The numerous water-cisterns were also done away with as much as possible. These regulations, although they left much to be wished for, showed their value in the next epidemic. A soil once polluted, even if not subjected to further pollution, requires a long time to get purified, but it gradually becomes

master of the impurities in it. Later on, it became more and more evident that no proper house-drainage was possible without a rational sewage system. The great value of this had been brilliantly shown in many English towns, and in Frankfort-on-the-Main, among German cities. After plans for a complete system of drainage had been drawn by an English engineer, Mr. Gordon, the work of sewerage was renewed, and from the years 1881 to 1887 48 kilometres of sewers were laid. In addition to these sanitary works, another of great importance was effected, viz., the erection of a new slaughter-house and a cattle-depot. This was opened in 1878, and at a stroke there was a disappearance from various parts of the city of 800 scattered private slaughter-houses, with all their inevitable accompaniments of filth and pollution. The city had not to wait long for evidences of the wisdom of exchanging a multitude of primitive slaughter-houses (1314) for one with proper sanitary appointments, as in 1881 the mortality from typhoid fever was reduced to 18 per 100,000. He illustrates the value of drainage and sewage by what occurred in a low part of the city, a quarter inhabited by 500 individuals. Previous to the sanitary works being carried out, this particular spot was noted as the hot-bed of typhoid fever and cholera. Since the introduction of water-tight middens, filling up of cisterns, and drainage, and without changing anything else, the spot has become absolutely free from these diseases, notwithstanding the fact that they still continue to drink from the same wells as before; while the same diseases continued as before in the nearest-lying parts of the city, although supplied with the best water, but where the old privy and midden system still prevailed, from every one of which the liquid pollution was greedily soaked up by a porous soil. He acknowledges that he cannot furnish a scientific explanation for the action of drainage and removal of filth any more than he can of the action of quinine, adding that one must reckon with facts which retain their practical value independent of any theory. Such a fact is that observed in Munich, that a sickly soil can be made healthy by certain technical treatment.

Von Ziemssen ¹¹⁴⁹ _{Jan. 17, 24; Feb. 16} ² has compared the morbidity with the mortality of enteric fever in Munich from 1866 to 1887, as a supplement to von Pettenkofer's inquiry into the reduction of mortality brought about by improved drainage. Before 1881 the

yearly average of enteric fever morbidity in hospitals was 594; for seven years subsequently it had been only 104, notwithstanding a great increase in population. Before the new system of drainage was introduced the hospital morbidity was 3.32 per 1000 of population; afterward, only 0.42 per 1000. The mortality from enteric fever in the whole city, from 1866 to 1880, amounted to 3118, with a yearly average of 208; but from 1881 to 1888 there were only 324 deaths from this disease,—a yearly average of only 40. The mortality per 1000 of population for the former period was 1.15; for the latter, 0.16. After all attending circumstances are fully considered, this great diminution in both morbidity and mortality is shown to be due to the improved drainage.

Von Ziemssen calculated the loss of earnings entailed by the morbidity from typhoid fever during the period 1866 to 1888, and the whole money loss, as far as could be calculated. It was not difficult to show that the loss was enormous and at first sight startling, and that the saving during the past eight years had been in proportion. He calculated that during the latter period, as compared with the preceding years, included in his tables, there has been a saving to the inhabitants at large of 2,946,000 marks; that is, if the morbidity had continued during these eight years at the same high rate as before, the loss of wages entailed by typhoid fever and the cost of feeding and attending the sick would have reached a total of over £18,000 per annum over the actual cost. In concluding his contribution, von Ziemssen considers the results already gained as regards typhoid fever as only part of the fruits of the great outlay that has been made. Not only is the nutrient soil taken away from typhoid fever, but the conditions for the epidemic development of cholera are removed with it, and that it will take decenniums to show all that has, from a hygienic point of view, been gained.

Augustus Caillé^{Jan. 19} reviews the present condition of knowledge concerning the etiology of typhoid fever. He points out the fact that microscopical examination is insufficient for the purpose of diagnosis, potato cultures being necessary under all circumstances. When the clinical data are insufficient, the stools should not be used for cultures, seeing that they contain many varieties of bacilli. The examination of peripheral blood usually yields a negative result. He refers to the investigations of Lucatello, who made

successful inoculations in ten out of thirteen trials with the blood drawn from the spleen by means of a Pravaz syringe. Blood drawn from the *taches rouges* has given a positive result in 50 per cent. of the cases. Bacteriological examinations are of little value as a preliminary procedure, seeing that they consume several days, while the clinical diagnosis may usually be made in the same length of time.

Edson⁵⁹ has carefully studied the etiology of enteric fever communicated to a number of new cases, in which the mode of propagation was evident. He concludes that typhoid fever never infects the atmosphere, that typhoid fever never arises *de novo*, and that the causes of the disease in the order of their frequency are as follow: 1. Infected water. 2. Infected milk. 3. Infected ice. 4. Digital infection. 5. Infected meat.

Hamilton¹¹⁴⁷;_{Mar. 23}² states that the day has gone by when it is needful to argue that enteric fever exists in India. The heavy mortality among British officers and soldiers is a matter of grave moment. "Recent arrival" and "youth" are the principal predisposing factors. In the first and second years of residence the percentage of liability is 64.12; in the third and fourth years, 24.9; from the seventh to tenth it drops to 8.52. Under 25 years of age it is 63.05; from 25 to 29 years, 26.10; and from 30 to 34 years, 8.65. The diet is too stimulating for the hot weather. The same observer²⁰⁴_{July} reiterates the opinion that the disease is prevalent among the natives and is conveyed to the troops, despite local sanitary precautions, by contaminated milk, "pop," water, and other beverages. He recommends stringent legislation with punitive provisions.

Roberts²⁰⁶_{June} has published an interesting note on the occurrence in dogs of lesions resembling those of enteric fever in the human subject. Roberts suggests that if further examinations should prove that dogs, as he suspects, are liable to typhoid fever, that fact would help to explain the continued prevalence of the disease in Indian cantonments, in spite of the sanitary precautions taken.

Harley,⁶ _{Apr. 13, 27, May 11} in his Lumleian lectures, discredits the germ theory of disease, believing that too little attention has been given to the following points: First, the superabundant vitality of the healthy body, which is liable to the invasions of micro-organisms only when depression has already brought it to a condition very near extinction. Second, the time necessary for the development

of micro-organisms, which can therefore have no part in the sudden transitions from health to disease sometimes witnessed. Third, the introduction of the animal medium as well as the germ in inoculation. Fourth, the fact that in cultures outside of the body the micro-organisms are the outcome of chances in the albuminous medium. [The author should have said that the *growth* of the micro-organisms is *correlated* with changes in the medium. As it stands, the proposition savors of "spontaneous generation," which he cannot intend.] He looks upon enteric fever as an effect of derangement of function. Two causes co-operate in the production of disease,—variation in environment and diminution of oxidation within the organism. He denies the contagious (infectious ?) nature of the disease, and holds that a chilling or wetting is sufficient to determine congestion of the intestines, with resultant enteritis and the phenomena of enteric fever.

The intimate relation between ague and enteric fever has always been forced upon the attention of military medical men, and great difficulty in classification has sometimes arisen. He cites cases to show the dependence of ague upon impure drinking-water, not necessarily of a specifically toxic character, and the development of enteric fever from ague. The daily rise and fall of temperature in enteric fever he considers a proof of its intermittent character. The continuous fever is a conversion of repeated paroxysms into a febrile vibration. Ague brings about arrest of cutaneous function and congestion of internal organs; hence, pyrexia. At first liver and spleen are stimulated, but when the temperature rises to 104° F. (40° C.) there is arrest of function. The intestines and lungs become laden with blood, and the lymphatic tissue of the former, being the most vascular, suffers most. This congestion, with irritation from imperfectly-digested faecal matter, brings about excoriation and ulceration.

The lesions of enteric fever may be produced without specific infection in a still larger class of cases: those of simple diarrhoea and dysentery, in which internal congestion is relieved by a copious exudation from the intestinal mucous membrane. He relates his own case of simple apyrexial diarrhoea, with motions resembling those of enteric fever. Seakale eaten sixty hours before, a fresh egg eaten forty-eight hours before, a post-mortem odor inspired three days before,—in other words, too much sulphur,—he looks

upon as the cause. The irritation caused by the stools might, if sufficiently prolonged, set up inflammation of the intestinal glandulæ.

Sewer-gas plays an important part in the production of enteric fever. In ordinary cases the intoxication is a slow one, increasing under the prevalence of the cause from day to day until a point is reached where health is overcome. In the case of a person who, superintending the opening of a blocked drain, is overcome by the stench, sickens and dies, we see the effects of a rapid intoxication. It is probable that the putrid exhalations are locked up in the haemoglobin, and possibly do no more harm than results from displacement of oxygen. It may be liberated, unchanged, probably in the liver; but in the more-profound intoxications either it is not displaced or, in the process of liberation, does more mischief. Milk is often, and rightly, credited with the production of enteric fever. Not only when putrefactive changes have commenced, but even when fresh, it may do harm owing to some derangement in the health of the cow. "None but savages should take it raw."

The records of the War of the Rebellion are quoted to prove the relationship between ague and enteric fever ("typho-malarial fever"), and also that between enteric fever and simple diarrhœa and dysentery. The circumstances under which outbreaks occurred, the facts of their progress and termination are analyzed, and the conclusion reached that the origin, progress, and termination of all are coincident and identical, dysentery being a slight modification or variation—sometimes one, sometimes the other—of the more or less general enteritis which is described as acute and chronic diarrhœa and enteric fever.

Rachford⁹ has made an instructive study of the toxic effects on animals of the ptomaines produced by the action of the typhoid bacillus on various articles of diet. He injected into rabbits' stomachs the whole culture, containing the active bacilli as well as the products of their growth, fearing to destroy or change the character of the ptomaines if he attempted to destroy the germs by heat or otherwise. One of the rabbits, however, seems to have died from typhoid fever and not from ptomaine poisoning. The food-stuffs used were: 1. Peptonized milk. 2. Peptonized beef. 3. Peptonized brain. 4. Bouillon and beef peptonoids. He concludes that the ptomaines formed in peptonized beef and

brain and the beef peptonoids of the shops produce profound nervous symptoms including stupor, the former producing no fever, however, and being less virulent than the latter. The ptomaines produced in milk cause neither stupor nor fever. His experiments thus accord with clinical experience that milk is the best diet in enteric fever.

Lavrand²²⁹ reports a number of cases in support of the view that enteric fever may be communicated by direct or immediate contagion. Valentini^{4, 36} thinks it likely, though not yet proved, that relapse of enteric fever is due not so much to new infection as to isolated colonies of the bacillus remaining capable of reproduction in the parenchyma of organs or in the bowel, and which, in consequence of trifling, injurious influences, penetrate into the circulation and bring about a general infection. Fraenkel has demonstrated the bacillus, 147 days after the beginning of the fever, in the pus of an encapsuled peritonitic abscess. Valentini relates similar experiences with abscess on the left shin and empyema.

The Association of Enteric Fever with Other Infections.—Karlinsky^{4, 36} reports a case of typhoid fever in which, three weeks after onset, bacilli, which the author regards as anthrax bacilli, were found in the stools. These organisms were nine μ long, and occurred both singly and arranged in chains of two or three links. In bouillon cultures, as many as five to ten links were connected. In some of the bacilli spores were seen. Subcutaneous injection of these bacilli killed young rabbits within two days. In the lymph of the animals, as also in the blood-vessels of the liver, the author found the same bacilli in large quantities. Other bacilli of similar size, together with streptococci, were found in the faeces. The patient died about the thirtieth day from the beginning of the illness. The lower ileum and caecum showed the characteristic lesions of enteric fever, while in the stomach and elsewhere in the small intestine were changes such as are occasionally seen in milzbrand. In the blood of the liver, the splenic veins, the veins on the surface of the stomach, and in the juice scraped from the spleen, anthrax bacilli were found in abundance. Typical colonies developed upon gelatin and agar cultures. The liver, the intestinal wall, and some of the mesenteric glands contained great numbers of the bacilli, whilst in the ulcers of the lower ileum and caecum typhus bacilli were found. The author ascribes the anthrax

infection to the fact that the patient had, upon the twentieth day of his illness, partaken of milk which was found upon investigation to have come from a cow infected with anthrax.

Holmes²² reviews the subject of secondary mixed infection in enteric fever with special reference to the development of complications. He points out the fact that the infection by the typhoid bacillus is followed by a definite train of symptoms which does not include suppuration. Many of the graver phenomena of the disease are due to infection by other bacteria, which have no essential, but only an accidental, relation with enteric fever itself. The invasion of the typhoid bacillus, however, produces changes in the lymph-glands and the intestinal and respiratory tract which lead to great diminution in their powers of resistance; hence, secondary invasion by pathogenic and other bacteria becomes an easy thing. Many of the pathogenic bacteria are only facultative parasites of man, living, for the most part, as messmates with him on the contents of his intestines, or, as some think, being necessary to mammalian digestion. When the intestine or any part of it dies, or the barriers which chance or association have thrown up are torn down by traumatism, or otherwise, the before harmless or even helpful bacteria set up a destructive, saprophytic colonization of the tissue of their host, and produce in the neighboring living tissues suppuration, coagulation, necrosis, haemorrhagic infiltration, lymphatic engorgement, or any of the results which are so frequently demonstrated in the infectious diseases, the nature of the lesion being dependent, of course, on the peculiar anatomy and physiology of the invading parasite. The most important of these pathogenic bacteria is the pus-microbe, both on account of its very general distribution and on account of the changes which it produces. The engorged and infected Peyer's gland is very soon attacked by suppurative bacteria. Ulceration and sloughing follow. The micrococci are carried on into the mesenteric glands, where they may, in favorable cases, be arrested and destroyed. This fortunate issue is not always realized. The filtering power of the gland is overcome and the great lymphatic channels are flooded with escaping bacteria; hence result infarcts and lesions of the mediastinal glands, infection of the bones, joints, and other cavities and larger organs of the body. The bacteria of suppuration circulate freely in the blood until they are arrested by the arterial capillaries and are removed by

the lymphatic apparatus. In certain cases, however, pus formation takes place in all parts of the body. The bacteria not only multiply in definite patches, but even in the circulating blood itself. The author believes that extensive destruction of the walls of the intestines leading to perforation is due to the local activity of the pus-microbe rather than of the bacillus typhosus. The same holds of the walls of the blood-vessels and the intestinal haemorrhage produced by their local destruction. If the eroded vessel be a vein, the septic bacteria may be carried into the arterial circulation and set up suppuration in the liver. Local abrasions of the skin make way for the infection of erysipelas. Tetanus also makes its way through the abraded skin or the intestinal mucous membrane.

That a specific infection is the cause of the disease which Ceci terms haemorrhagic infiltration is now well demonstrated. This is the secondary infection which causes the uncontrollable epistaxis in diphtheria. The author thinks that there is no doubt that the same form of infection is responsible not only for the epistaxis of typhoid, but also for a great many cases of diffuse intestinal haemorrhages and haemorrhages from the stomach and colon. Noma, a malignant oedema, and diphtheria present no anomalies in their appearance in typhoid. The frequency of tuberculosis following enteric fever is to be explained by the low state of vitality to which the patient is reduced and the tardiness of the convalescence. Latent tuberculous spores in old glandular foci or in cicatrices of the lungs vegetate again, and at the same time the condition of the patient exposes him peculiarly to fresh infection from tuberculous nurses, patients, or food. The following practical conclusions are theoretically justified, and may be provisionally supported: The local effects of an invasion with the typhoid bacillus is a non-destructive one, and the tendency is toward complete restitution to a state of health. The primary lesion in the bowel or in the larynx gives rise to a point of least resistance, and the general impairment of nutrition renders all the causes which ordinarily determine the localization of infection far more potent. Pyogenic and other forms of infection do take place through the primary lesion, and result in more than ordinarily serious consequences on account of the diminished resistance of all tissues of the body. Therefore, all traumatism to the abdomen, either external (through violent, careless, or unnecessary palpation) or internal (through the use of

food containing solid particles which might cause abrasion), should be strenuously avoided, and the patient should be in a position of most complete rest.

The imminent danger of typhoids to tuberculosis is conceded by all, and every caution should be taken to prevent infection through contact with phthisical patients or nurses, or through confinement in rooms occupied by them, or through utensils of food which might furnish the infection; and, where there is reason to suspect latent tuberculosis, the use of all antitubercular measures is recommended. The treatment of typhoids and phthisical patients in the same hospital-wards is little short of criminal, and the employment of tubercular nurses, attendants, or cooks, or ward-servants, is incompatible with the present state of our knowledge of tubercular etiology. As typhoids are more than ordinarily susceptible to all contagious diseases, they should be rigorously excluded from direct and indirect contact with diphtheria, erysipelas, and all wound diseases; the most thorough cleanliness should be observed about the person, and the towels, bedding, and utensils should be beyond reproach. In the care of the lips, the tongue, and the nose, care should be taken that no abrasions be made which might open a way to secondary invasion. So-called relapses are often due to a secondary mixed infection. Therefore, in all cases of relapse careful, diligent, and, if necessary, repeated search should be made for food or infection which could give rise to the symptoms of relapse or any anomaly of temperature. When a localization of infection has been discovered, the fact that the patient is, or has been, suffering from typhoid does not interdict the employment of ordinary surgical principles, but furnishes an additional and imperative indication for speedy operative interference, as furnishing the only known means for preventing the most disastrous issue.

Pathology.—Janowsky¹¹³ _{Apr. 7} considers the long-continued form of enteric fever to be a series of relapses due to successive re-infections. Even where there is no febrile interval, it will be observed that there is a secondary fever curve, beginning before the first has been completed. The first may be greater than the second, or the reverse may obtain. If it be further observed that the secondary infection may occur just at the acme of the development of the first, all doubts concerning the true nature of the long-continued cases will be resolved. Clinically, each new infection is manifested

by new temperature curves, increased severity of typhoidal symptoms, greater enlargement of liver and spleen, fresh crops of rose-spots. Anatomically, there is swelling of the solitary follicles and Peyer's patches, which explains how at autopsies there may be found fresh enlargements of the solitary follicles and fresh infiltrations of Peyer's patches in the neighborhood of cicatrized ulcerations.

Schmidt³²⁶ ⁹⁹ _{B.43, II, 3; Aug.} has made a study of relapses in enteric fever based on the material furnished by the clinic of Wagner, 1882 to 1886; 561 cases gave 49 relapses. A relapse is defined to be a fresh outbreak after the primary attack has run its course. It is distinguished from a recrudescence by following the original attack after an interval of not less than twenty-four hours, during which temperature is within normal limits and there are no febrile symptoms. Relapses and recrudescence are identical when looked at from the stand-point of pathological anatomy, but clinically it is convenient to draw a distinction between them on account of the severity and relatively high mortality in recrudescence and for etiological and other reasons. Schmidt adopts Ziemssen's test, which requires two of the three cardinal symptoms, step-like temperature-chart, roseola, enlarged spleen, to settle the diagnosis. Omitting the cases which do not satisfy Ziemssen's criterion, we have 38 relapses in 561 cases of enteric. This gives a percentage of 6.8, which agrees with the results of German authorities. Thus, Gerhardt obtained a percentage of 6.3 from 4000 cases selected from various epidemics. Human's percentage is 6.5 and Steinthal's 7.5. No doubt, as the author remarks, the proportion of relapses varies with the locality and the epidemic as well as with the observer. Murchison's low percentage (3) is partly explained by his attaching too great importance to the rose-spots.

From an analysis of his 38 cases of undoubtedly relapses, Schmidt obtains the following results: The duration of the relapse varied from six to twenty-two days, the mean duration being 12.8 days. Twenty-four of the cases began with a step-like rise of temperature. In the 14 remaining cases the temperature rose from 39.5° C. to 40° C. (103° to 104° F.) in from twelve to thirty-six hours after the onset, and 1 case began with a rigor.

The cases which had an acute onset resembled also, in their relatively short course, abortive typhoid, in the sense in which Liebermeister uses the term. There was a roseola in every one

of the 14 cases; in 8 of them the spleen could be distinctly felt; in 4, severe bronchitis; in 5, enteric stools; in 1, ordinary diarrhoea, and in 8 the motions were formed and constipation frequent. In only 3 of the 24 cases were there characteristic enteric stools. The spleen was enlarged in 21 and there was an eruption in 14. Often the patients felt quite comfortable. In 25 of the relapses the eruption was carefully noted. In 2 it appeared on the first day, and in 18 between the third and the seventh day. In 4 cases the apyretic interval which separated the relapse from the original attack was only one day, in 4 it was three days, in half the cases not more than a week, and in only 3 over a fortnight.

Respecting the etiology of relapses, our author concludes, from his own cases, and from a careful examination of the experience of others: 1. That the occurrence of relapses in enteric depends on the character of the epidemic—in other words, on peculiarities of the virus. 2. Gross outbreak of relapses. 3. Severe primary attacks are less likely to be followed by relapses than mild and moderate attacks. 4. Individual idiosyncrasy is probably of no importance. 5. The influence of treatment in causing relapses is doubtful.

Jaccoud²¹² considers relapses much more frequent in enteric fever than is usually believed. He has seen more than 60 cases,—between 9 and 10 per cent. of his personal statistics. Certain authors consider the treatment by cold bathing likely to increase the number of relapses. Jaccoud's statistics, which refer to a different plan of treatment, show a larger proportion of relapses, however, than have been cited in connection with the method of Brand. Contrary to the opinion that relapses supervene upon an incomplete primary attack, Jaccoud's statistics show the first attack to have lasted twenty-eight days or more. The duration of the afebrile interval is quite important from a practical point of view. In most instances it was from five to seven days; in other, quite numerous, cases it was prolonged to ten days, and in two exceptional instances the relapse occurred twenty and twenty-nine days, respectively, after complete defervescence. In other cases the interval was singularly abridged, fever recurring in two days or even in less than twenty-four hours. In the majority of cases the temperature reached a height equal to or exceeding that of the primary fever. The duration of the relapse, ordinarily, was from

seven to ten days, sometimes two weeks, exceptionally, or was prolonged to eighteen and twenty-one days. On the other hand, in some cases it was as brief as five days. From this fact the author concludes that the theory of a second infection is untenable. In 64 cases there was no death. Two and three successive relapses have been noted in some cases.

Relapse occurred in 21 cases out of 129 studied by F. C. Shattuck⁹⁹ (16.28 per cent.). In 1 case was a second relapse. The author adopts Irvine's distinction between relapse (denotative of renewal of the complete typhoid process), whether intercurrent or consecutive, and recrudescence (renewal of pyrexia, more or less transitory). In 11 instances the relapse began before, and in the same number after, complete defervescence. In the 11 intercurrent cases the renewal of the process appeared to take place from the third to the fifth week. In the consecutive cases the apyretic interval was 1 day in 2 cases, 2 days in 4 cases, 3 days in 1 case, 6 days in 1 case, 8 days in 2 cases, 9 days in 1 case. The duration of the second attack varied from 11 days to 29 days, with an average of 19 days. The single death was in a consecutive attack. The maximum of the temperature curve was reached on the fourth to sixth day in 18 cases, on the fifth day more often than any other (8 cases). Treatment was expectant. In 38 cases (29 per cent.) no drug and no alcohol was used at any time in the course of the disease.

Handford⁶ believes the visceral lesions recurring in enteric fever to be due chiefly to high temperature, septic organisms, and typhoid organisms (if such were present, of which he had not yet convinced himself). In all his cases the lesion described pointed rather to what had been called mixed infection. He had noted that organisms passing through certain individuals appeared to have had their virulence increased, while in others it was diminished, this being especially true in cases of what might be called diarrhoea resulting from the inhalation or ingestion of micro-organisms. He described in detail the changes in the stomach and intestines, including minute infiltrations, small ulcers, etc. In the lung he met with a special form of pneumonia, which, though lobular in its distribution, was croupous or exudative in character. There were also marked interstitial changes. This form of lesion appeared to be rapidly followed by death, and it seemed to be due to actual septic infection. In the heart there was degeneration of

the muscular fibres, associated with more or less interstitial change. In the liver he had frequently demonstrated the presence of an interlobular infiltration of small round cells, which eventually became converted into fibrous tissue. This would explain those cases of non-alcoholic cirrhosis met with especially in children. There were usually found also cloudy swelling and fatty degeneration of the liver-cells, and in some cases these changes were due more or less directly to the presence of some septic organisms, although there might be no abscess formation. The most marked changes in the kidney were interstitial and glomerular nephritis.

L. H. Cohen⁹⁹ _{Sept. 12} has published a thesis in which he sets forth the daily variations in the weights of patients in typhoid fever. The conclusions of his studies are as follow: 1. Typhoid fever presents two distinct periods, one of loss and one of gain; certain accidental causes may modify them, but cannot affect their general character. 2. The daily loss is due to febrile combustion, chiefly, and but little to abstinence. 3. The daily loss varies with individuals. 4. The losses in nitrogen and in weight are almost parallel with the march of the temperature, without always following it exactly. 5. The study of the weight-chart may aid in prognosis, a continual rise in the weight being a sign of convalescence. 6. The complications of the disease augment the loss of weight. 7. The study of the loss of weight enables the physician to determine with precision the action of nutritive substances in fevers. 8. The loss of weight in a typhoid patient takes place each day in a uniform manner.

Lafleur²⁸² _{May} exhibited specimens showing a universal plastic peritonitis complicating enteric fever. The adhesions were firmest about the liver and spleen, those between the coils of intestines being quite recent. The capsule of the liver was much thickened, and the organ itself smooth and diminished in size and weight. On section the surface was rough, of a tawny color, and traversed by bands of fibrous tissue, most abundant near the capsule. Microscopic examination showed great thickening of the capsule, with irradiation of fibrous septa inclosing islands of liver-tissue, which were more or less atrophied. The central veins of the lobules were somewhat dilated and the adjacent cells atrophied. Both auricle and ventricle of the right heart were dilated, the muscle showing fatty degeneration.

Complications and Sequelæ.—Landgraf⁶⁹ _{Jan. 6} reports on the laryngeal conditions in 166 cases of enteric fever. In a great number, including many fatal cases, no pathological alteration was observed at any time. The most frequent lesion was so-called catarrh, a condition associated with poor local nutrition and epithelial erosion. Subjective and objective symptoms, other than those furnished by laryngoscopic examination, were lacking. Edema is a serious complication, but he attaches little prognostic importance to the marginal ulcers sometimes seen, especially on the epiglottis. They had healed even in fatal cases. Other deeper ulcerations, which occurred not only on the epiglottis, but within the larynx, might be complicated with perichondritis, and were of grave import. The rarest lesions were ulcers which, from the time of their appearance, the infiltration of their bases, and the undermining of their edges, must be considered specific typhoidal lesions. Three cases of perichondritis were observed, all arytenoidal and following ulceration. Two cases of muscular paralysis occurred during convalescence.

Lewy¹⁵⁸ _{B.M.J. 1888} reports a fatal case of laryngotyphus in a child aged 1 year. Death occurred on the eighth day. Autopsy showed the intestinal lesions of enteric fever, with fibrinous laryngitis, fibrinous pneumonia, and hyperplasia of the spleen. A fatal case of necrosis of the two arytenoid cartilages in a male, aged 18, during typhoid fever, is reported by Souques.⁷ _{No. 37, '88}

Stolterfoth⁶ _{Apr. 6} observed in the Chester General Infirmary the following interesting case: M. R., aged 7, admitted on December 19, 1888, having been ill at home for fourteen days before admission. Two sisters and a brother had been admitted two days previously. There was a marked eruption on the abdomen and back; typical stools, but no diarrhœa; marked prostration, with considerable nocturnal delirium. Temperature, 102.8° F. (39.33° C.); respiration, 28; pulse, 120. The case progressed favorably till December 31st, when there was a strong attack of haemorrhage, half a pint of blood being lost. This was treated by ergotine and opium, with ice externally. January 2d, 1889, haemorrhage again occurred, but not so profuse as before. January 6th, a small strumous ulcer on the left middle finger became inflamed, and was rapidly followed by cellulitis of the forearm with free suppuration. Treated by free incisions and boracic fomentations.

On January 21st the respiration was difficult and stridulous, and, in spite of the treatment pursued, progressed to such an extent that on February 14th suffocation was imminent. The larynx, which was examined with great difficulty, was found to be much swollen and œdematosus, and some small superficial ulcers were seen on the vocal cords. Tracheotomy was performed under chloroform, and the patient rapidly improved. On the fourth day the tube was removed, but had to be replaced on the sixth, owing to a return of the former symptoms. On the eighth day the tube was permanently removed. On the twentieth day the wound was quite healed, and the patient practically well.

Harrison⁶ _{Nov. 16} records a case of cellulitis of the neck, spreading to the apex of the lung, following enteric fever in a military recruit. The patient had been the subject of two relapses. The last relapse subsided February 16th. On April 20th he was able to be up all day. May 5th he complained of sore throat, and the tonsils were observed to be swollen. During the night difficulty of respiration supervened, probably from laryngeal obstruction. The tissues of the neck and throat were œdematosus and infiltrated. Swallowing became impossible. Febrile reaction was marked. Relief was given by division of the tissues in the middle line of the neck, in the interval between the jaw and hyoid bone. Later, another deep incision was made behind the upper portion of the sterno-mastoid. Apex pneumonia supervened, and was appropriately treated. Recovery took place.

Snow¹¹² _{Feb.} reports a case of enteric fever, with double suppurative parotitis, in which recovery took place. Hue²⁰³ _{Mar. 1} reports a case of profuse vomiting of coffee-ground-colored blood, at the onset of enteric fever, in a well-preserved man aged 69 years. In the course of three days the haematemesis recurred. There was also at times bleeding from the gums and haematuria, the patient presenting an exsanguine appearance. Fever oscillated between 38° and 39° C. (100.4° and 101.2° F.). The symptoms lasted four weeks before convalescence was established; relapse occurred and lasted fifteen days, after which recovery progressed rapidly. There was no personal or family history of haemophilia. Hue is sure of his diagnosis. Buffet has observed a similar case, but his patient was a gouty subject. Neely¹⁸⁶ _{June} records a case of fatal haemorrhage in a farmer, aged 25 years, beginning on the twenty-second day

of enteric fever and continuing for forty-eight hours. Complete defervescence had taken place on the twenty-first day. Bleeding took place from nose, urinary passages, and bowels, and there were effusions into the skin. The epistaxis was uncontrollable, despite plugging and injections of Monsell's solution. The author attributes the complication to the too free use of ammonium nitrate, of which 5 grains (32 centigrammes) had been given every five hours for sixteen days. In addition, 15 grains (1 grammme) of quinine had been given every morning and evening. There was no family history of haemophilia nor any previous haemorrhagic tendency of the individual. Ebermaier²²⁶ was able, in 2 cases of periostitis, occurring as a complication of enteric fever, to prove the presence of the typhoid bacilli in the pus and blood present. In neither were any other micro-organisms found. The author gives 6 other cases of periostitis occurring during the course of enteric fever, one of which went on to suppuration, the pus of which, however, was not examined bacteriologically; but he thinks that the results obtained from the two first cases allow us to consider the typhoid bacilli as the causative agent. He considers that the bacilli reach the periosteum from the medullary part of the bone through the Haversian canals, and is led to this belief from having obtained cultures of the typhoid bacilli from the medullary part of a rib removed post-mortem from a fatal case of enteric fever.

R. P. Long²²⁷ reports a case of gangrene of the left leg, extending to the upper third of the thigh, following enteric fever. Amputation was done and recovery ensued. The patient was a female factory operative aged 17 years. There was no evidence of any cardiac valvular lesion, so that the arterial occlusion is attributed to obliterating arteritis of the left femoral. Koehn²²⁸ reports a case of moist gangrene of left leg occurring during an attack of enteric fever in a male patient, aged 29, treated with antipyrin. Amputation was performed at the middle third of the thigh on the afternoon of the twenty-third day of the disease. Death occurred twenty-four hours later. Post-mortem examination was refused.

Leclerc reports a case of enteric fever contracted in Algeria in the course of which, in the author's opinion, malarial infection seems to have occurred, giving rise to an intermittent, febrile type.

Phlegmasia alba dolens occurred on the twenty-sixth day, and prolonged the case another twenty-six days before recovery took place. The treatment by cold baths was suspended on the supervision of this accident, but nine days afterward was resumed (though modified to progressive cooling) on account of renewed high fever,—41.4° C. (106.5° F.). Embolism, which might have been feared as a result of the baths, did not occur.

De Souza Martius²¹⁸ _{June} reports 3 cases of recovery after perforation in enteric fever, these being, as far as he knew, the only instances on record in Portugal. The patients were all foreigners. Treatment consisted of morphine internally, ice to the abdomen, and iced milk and champagne to drink. Branson⁶ _{Nov. 2} reports a case of perforation, with peritonitis, followed by recovery under opium treatment, in a professional nurse aged 26 years. The perforation, which was attributed to indiscretion in diet, apparently took place between the twenty-sixth and thirtieth days of the disease. On the thirty-eighth and succeeding days a number of foul-smelling sloughs were passed by the stools, one, passed on the fortieth day, being fully six inches (15 centimetres) long by $\frac{1}{2}$ inch (13 millimetres) in diameter.

Minich⁶⁰ _{Feb. 16} reports 6 fatal cases of pneumonia complicating enteric fever in which the affected lung was that of the side nearest the window. He does not now permit the side of the bed to be parallel with the window-wall, and has had no pneumonia since the change.

Hall⁹⁹ _{Sept. 26} analyzes 108 cases of enteric fever which were seen during six years' practice in Colorado. The mortality was 7.4 per cent. There were 6 cases of intestinal haemorrhage, 3 fatal. Several lung complications were noted in 11 cases, 4 fatal. One woman was confined at term without serious symptoms; another, four months advanced, carried the child through with safety. Five cases relapsed, 1 proving fatal. Three cases of lymphangitis of the leg occurred, 1 fatal. The tissues in the neighborhood of the sublingual parotid gland inflamed and sloughed in a strumous girl of 8 years. The destruction involved the whole anterior part of the cheek, causing death from haemorrhage.

F. C. Shattuck⁹⁹ _{Sept. 26} analyzes 129 cases of enteric fever treated in hospital. The total mortality was 8.37 per cent. Haemorrhage occurred in 2 of the fatal cases, Cheyne-Stokes respiration in 2,

broncho-pneumonia in 2, pericarditis in 1, general convulsions in 1. One death took place during a relapse, the patient being 54 years of age. Diarrhoea occurred in 25 per cent. of the cases, constipation in 36 per cent., occasional looseness in 24 per cent., regular motions in 15 per cent. Splenic enlargement was noted in 78.5 per cent. Among complications we note venous thrombosis (femoral), 7 per cent.; periostitis, 2 cases; lobar pneumonia, 2 cases; melancholia, 1 case; hemiplegia (embolic, early), 1 case; neuritis, 2.3 per cent.

Sudden Death in Enteric Fever.—Latil³⁵ reports a case of rapid death from bulbar paralysis following enteric fever. The patient was a woman of 42 years. The fever was grave from the outset, both on account of hyperpyrexia and the quick and extreme prostration. Nervous phenomena, such as agitation and delirium, were not sufficiently marked to deserve special note. Paralysis of the bladder occurred on the eighteenth day. Pulmonary complication, manifesting in the fourth week, prolonged the case, and on the forty-first day the temperature oscillated between 37° C. (98.6° F.) and 38° C. (100.4° F.). On the forty-second day the author noted a complete contracture of the masseters, not, however, absolutely preventing opening of the mouth. She swallowed liquids without difficulty. Voice was somewhat nasal in tone. There was no other contracture of head- or neck- muscles, nor strabismus. Temperature was 37.60° C. (99.7° F.); general condition good. Toward afternoon trismus became more marked, dysphagia developed, the nasal quality of the voice became more pronounced, and a few drops of liquid, taken with great pain, were regurgitated through the nose. Pulse was 120 and irregular; temperature, 39° C. (102.2° F.). Respiration was short and somewhat rapid, the patient complaining of oppression and manifesting great anxiety. Auscultation revealed at the base of both lungs the sibilant and mucous râles that had existed for some time. The heart-beats were quickened but feeble, the sounds muffled and presenting the characters of the foetal bruit described by Huchard. The patient grew rapidly worse, asphyxia was manifest at midnight, and death occurred the next morning. The author briefly reviews some of the literature of the subject, and leaves us in doubt whether he considers the lesion in his case to have been central or a peripheral neuritis.

Libouroux³⁶³ reports a case of sudden death during the third week of enteric fever, in which the autopsy showed a small haemorrhage in the floor of the fourth ventricle, attributed to rupture of capillaries. Nothing pathological was discovered in the heart. McPhedran⁹, reports a case of sudden death in enteric fever, from heart failure. The patient was a laborer, aged 32 years. At the autopsy, ulcers in lowest 20 inches of ilium indicated the end of second week of disease. Mesenteric gland near ileo-cæcal valve very large and diffluent. Solitary glands in cæcum, ascending and transverse colon enlarged, but not ulcerated. Kidneys healthy. Lungs: some old pleuritic adhesions; slight œdema at right apex; venous congestion posteriorly, bilateral, probably *post-mortem*. Heart: right auricle greatly distended, with recent black clot; right ventricle considerably distended; left side of heart contained a little blood; ventricular wall not contracted. Brain not examined.

The author considers that the explanation of the case is to be found, according to the theory of McWilliam, in the cardiac delirium resulting from the prolonged disturbance of nutrition due to the fever.

Hutchinson¹¹² reviews the sequelæ of enteric fever as they affect (1) the nervous system; (2) the circulatory system; (3) the respiratory system; (4) the digestive system; (5) the genito-urinary system; (6) the skin, etc. Among personal cases he relates one of diabetes occurring in a lady 40 years of age. During the fever her urine was normal. Convalescence was tedious, and protracted by a succession of boils, which led to re-examination of the urine, and to the detection of sugar in it. Her mother died of diabetes at an advanced age.

“*Post-Typhoid Paralyses*” is the title of an interesting paper by Kebler.⁵³ July 13 He reports 2 cases. In one, about a week after convalescence, there occurred diplopia; dysphagia, with regurgitation of fluids through the nose; ataxia, paresis of arms and legs, with absence of reflexes. Anæsthesia over the affected parts was marked. Gradual improvement took place. The other case, three days after discharge, suffered with shooting pains in both legs, followed by marked paresis, with slight anæsthesia, the gait being ataxic. Temperature, 100° F. (37.77° C.); patellar reflex preserved. On the eighth day the temperature was normal; paresis

increased; knee-jerk absent. On the eighteenth day patient was again discharged, with only slight paresis remaining. Complete recovery has since been reached.

Zenner spoke of the case of a man, 32 years of age, in whom hemiplegia came on during convalescence from typhoid fever and remained permanently. Here there can be no doubt of a vascular lesion in the brain, probably occlusion.

De Beck referred to the pupillary conditions in Kebler's case as a point of discrimination from post-diphtheritic ophthalmoplegia. The pupil was dilated *ad maximum*. It contracted at first when light was concentrated upon it, but, while still under illumination, again relaxed to a moderate dilatation.

Kästenbaum⁸ _{Aug. 22} has studied the nervous disorders which occur during convalescence from enteric fever.

Nothnagel having brought the literature of the subject down to 1872, the author has collected and summarized a large number of cases reported since that date. He has, however, not found any report of hystero-epileptiform attacks, and therefore records a case of this kind in a waiter, 14 years old, occurring in his own practice.

A. H. Pratt⁷ _{Mar.} relates a personal experience of enteric fever. The noteworthy points were a peculiar, short, rapid, jerky respiration, lasting well into convalescence, and visual disturbances, including apparitions, for some two weeks after recovery.

Heath²⁴ _{Dec., '88} records an interesting accident in the management of a case of enteric fever. The patient, a native of Canada, 23 years of age, was admitted to the United States Marine Hospital, Detroit, Michigan, June 12, 1888, at the end of the second week of a severe attack of enteric fever. Two weeks after admission he swallowed the clinical thermometer which the nurse had put under his tongue. Mustard was given to produce emesis; this failing, castor-oil was administered in the hope of facilitating the passage of the thermometer through the bowels. This also failed until twelve days later, when the thermometer passed through the anus unbroken, the mercury registering 40.4° C. (104.7° F.).

According to Branson,⁶ _{Apr. 29} the returns of cases of typhoid fever recently published by the Central Board of Health, Australia, as having occurred from December 1, 1888, to January 24, 1889, are as follow:—

		Cases.	Fatal.
Melbourne, . . . . .	. . . . .	34	6
Ballarat, . . . . .	. . . . .	3	2
Collingwood, . . . . .	. . . . .	19	8
Fitzroy, . . . . .	. . . . .	16	5
Prahran, . . . . .	. . . . .	27	7
Richmond, . . . . .	. . . . .	28	4
Sandhurst, . . . . .	. . . . .	18	7
South Melbourne, . . . . .	. . . . .	36	13

This statement shows a total of 181 cases with 52 deaths,—that is, 34.8 per cent.

Diagnosis.—Taylor⁶, reports on the value of Ehrlich's urinary test in the diagnosis of typhoid fever. It seems to have been unknown in England until Arthur Sansom learned of it in America. The characteristic red coloration was produced in the urine from every case of enteric fever after the first week, and until the morning temperature became normal. It was also very exceptionally found in the urine of healthy persons, but the red color was not well marked. It was especially common in measles, absent in acute general tuberculosis, but present in a few cases of acute and chronic phthisis. It was not found in lobar or lobular pneumonia, and in only two of a large number of cases of rheumatism was it present. Apart from conditions of pyrexia, it was found with more than average frequency in albuminous urines from cases of both acute and chronic renal disease. The test is made as follows: 25 parts of solution A (consisting of a saturated solution of sulph-anilic acid in dilute hydrochloric acid, 1 to 20) are added to 1 part of solution B (sodium nitrite, 5 per cent. in distilled water), and the whole mixed with an equal bulk of urine and rendered alkaline with strong ammonia-water.

André²⁶ thinks that albumen always appears in the urine of typhoid patients, especially during the earlier stages, and that, as this is a constant symptom, it becomes an important factor in arriving at a diagnosis.

Abortive Form.—Jaccoud¹⁷, affirms that nothing in the early days of an abortive case of typhoid fever enables us to distinguish it positively from the ordinary form of the same malady. The two forms are to be distinguished only by their duration, the symptomatic manifestations being the same. After the eighth day, however, certain indications are furnished by the course of temperature, which, in the abortive form, commences to descend earlier than in

the ordinary form. Even this rule, however, is not constant. It occasionally occurs that in the abortive form the defervescence is abrupt rather than gradual, so that within forty-eight hours after the beginning of the convalescence the symptoms are identical in the two cases. It is easy from this point of view to understand the false position of the physician, who, having announced the presence of typhoid fever, finds himself obliged, in the eighth or tenth day, to declare that the patient is cured of an affection the duration of which all the world knows to be usually protracted. It has been said that the abortive form of the fever is especially frequent among young subjects from the age of 16 to 28 or 30 years, and that it occurs more commonly in the male sex, in individuals of robust constitution, and that it especially prevails during certain epidemics, and is rarely seen in others. These facts, however, have little value from the stand-point of diagnosis, since not only all the symptoms may be the same, but also they may present themselves of the same intensity in the abortive as in the grave forms. Even such symptoms as delirium and albuminuria may present themselves in the abortive form. Even the retention of the urine, amounting to the necessity of catheterization—a symptom, in the ordinary course of the disease, of the third or fourth week—may occasionally show itself in the abortive form. The duration of the abortive form, measured by the date of the final defervescence, is most frequently from ten to twelve days. Then comes, from the point of view of frequency, an interval to the eighth or tenth day; exceptionally, the defervescence takes place upon the seventh day. In point of fact, it is between the eighth and twelfth day that the convalescence sets in, and the diagnosis then must be based upon the general weight of the symptoms, particularly upon the presence of exanthem and the gradual ascent of the temperature in the beginning. It is therefore necessary for the physician, as soon as the symptoms make it necessary for him to speak of a case of enteric fever, to inform the friends of the patient of the fact that there are certain cases of this disease which run a short course,—cases not generally understood by the public,—and that it may happen that the case under consideration is one of these.

The diagnosis of the ordinary forms of enteric fever presents special difficulties during the first week, or until the appearance of the eruption, which takes place normally from the seventh to the

ninth day. At this moment all doubt disappears, for if the *taches* show themselves they render the diagnosis certain; if not, the other symptoms are sufficiently established at this date to dispel all doubt. Prior to this period, however, the difficulties of diagnosis impart special value to a general knowledge of the different forms of beginning typhoid. The most useful distinction from this point of view relates to the fact that usually enteric fever begins with a prefebrile period, the period of prodromes of former writers; exceptionally, there is not such a period.

In the former case the prefebrile period presents symptoms without localization, such as progressive deterioration of health, weakness, restless sleeping, headache, loss of appetite, vertigo, tinnitus aurium, epistaxis, etc. If this period is prolonged to four, five, or six days, it is in itself sufficiently characteristic of the beginning of typhoid. But it occasionally shows itself in another form, namely, that of gastric distress, pure and simple. There is nothing else, the resemblance between the two conditions being for two or three days, or until treatment is instituted, complete. Then, after the administration of an emetic or a cathartic, as is customary in gastric distress, the *malaise* of the later condition disappears completely. In the case of enteric fever, however, it continues. By this means only can this error of diagnosis be avoided. When, however, the prefebrile period is absent, the diagnosis is still more difficult. Sometimes the onset occurs suddenly, with continuous fever and headache; sometimes the attack begins abruptly by pain in the head and fever, which, instead of being continuous, is intermittent during the first three or four days. Between the paroxysms the relief is not complete. There remains a certain degree of *malaise*, notwithstanding the fall of temperature.

The author insists that in the first form—that is to say, with continuous fever and headache—the diagnosis must be uncertain. The difficulties regarding the existence of pleurisy, pneumonia, etc., usually come to an end in the course of forty-eight hours, whilst those relating to the eruptive fevers commonly come to an end after several days,—in the case of measles, for example, upon the fourth or fifth day. In the second form—that is, where the disease begins with an intermittent fever—the diagnosis must be deferred until the fever becomes continuous, especially if the physician is practicing in a malarious region. In conclusion, Jaccoud points out

the fact that the better the variations of the invasion of typhoid are understood, the greater are the difficulties of diagnosis, and the more important a certain degree of reserve at the beginning of the attack.

Montefuseo, of Naples, Italy⁶⁷³ (collaborator), states that augmentation of surface temperature in the right iliac fossa and in the region of the kidneys is always present in enteric fever. The increase is, in the majority of cases, at least, 1 degree, and may rise to 2 degrees. The maximum is observed during the first two weeks and, in severe cases, during the last few days of the disease. The splenic temperature is, in general, higher by two-tenths of a degree or more (sometimes by nearly 1 degree) than that of the right iliac fossa. The inverse is rarely observed, and, in such cases, the difference is but one- or two-tenths of a degree. The local temperature is always lower than the axillary. It is slightly higher in the evening than in the morning.

J. W. Moore¹⁶ Dec., 1888 reports in detail 4 cases of accidental rashes in enteric fever. They were, respectively, simple hyperæmia or erythema fugax, miliary eruptions, erythema simplex vel scarlatinæ, urticaria. The scarlatiniform rash is discussed at length with references to literature. He sums up as follows: 1. Not infrequently, in the course of typhoid fever, an adventitious eruption occurs, either miliary, urticarious, or erythematous. 2. When this happens, a wrong diagnosis of typhus, measles, or scarlatina, respectively, may be made, if account is not taken of the absence of the other subjective or objective symptoms of these diseases. 3. The erythematous rash is the most puzzling of all, but the prodromata of scarlet fever are absent, nor is the typical course of that disease observed. 4. This erythema scarlatiniforme is most likely to show itself at the end of the first or in the third week of typhoid fever. 5. In the former case it probably depends on a reactive inhibition of the vasomotor system of nerves; in the latter, on septicæmia or secondary blood-poisoning, or both these causes may be present together. 6. The cases in which this rash appears are often severe, but its development is important rather from a diagnostic than a prognostic point of view. 7. Hence, no special line of treatment is required beyond that already employed for the safe conduct of the patient through the fever.

Comegys⁶² Feb., 1901 recognizes the malarial variety of enteric fever: 1. The febrile accession is much more violent, temperature being often

104° or 105° F. (40° or 40.55° C.) on the third day, with remarkable daily fluctuations; at about the fifteenth day it has almost ceased as by crisis; within a day it will reappear on a high plane, and in a remitting character will continue for an indefinite period. 2. Diarrhoea is by no means as common; indeed, constipation is the rule. Tympanites and rose-spots are never marked. Numerous sudamina are frequently seen; tenderness in the right iliac fossa is moderate. Intestinal haemorrhage is more frequent and more violent. Severe neuralgic pains in the abdominal walls and hyperæsthesia of the skin are marked. 3. Occasionally during the high fever he has observed suppression of urine, with albuminuria and tube-casts, accompanied with intense pain in the lumbar region due to renal congestion. 4. Hebetude is not common, but acute phrenitis is occasionally developed and is an extremely grave complication. 5. The tongue is longer, with whitish fur, and slightly oedematous. Lungs and heart are not so apt to be involved; there is less sub-sultus tendinum, but anaemia is more profound.

Texas physicians ⁸⁵ have been engaged in an extended discussion on so-called typho-malarial fever. The subject remains in the same doubt as before. Some of the papers contain interesting records of personal experience.

Draper ⁵⁹ said that any one who has seen a great deal of typhoid fever must have a doubt as to whether he is not dealing with several forms of continued fever rather than with one. Kinnicutt ⁵⁹ would emphasize the occasional most prominent localization of the typhic infection, even at the onset of the disease, in other portions of the body than the intestine. He cites 2 cases, one of pneumonic process in both upper lobes with acute nephritis, and the other of basic pneumonia of one lung, occurring in a household where three had previously developed, within a few days of each other, typical typhoid-fever symptoms. Rendu ¹⁵² reports an instructive fatal case of enteric fever, beginning as a pneumonia of the right upper lobe. Finucane ⁶ reports a fatal case of perforation in an insane woman in whom enteric fever had not been suspected. Death occurred within forty-eight hours of the first complaint, that of pain in the abdomen.

Geographical Distribution.—Riordan, ²⁰⁶ in continuation of his paper on the subject of enteric fever in India, referred to in the ANNUAL for 1888, vol. i, H-38, presents notes of cases and

statistics in support of his view, which we regard as absolutely untenable, that enteric fever, as seen in India, is not of specific but of climatic or malarial origin. His conclusions are as follow: "1. From mild ague to the most severe enteric so called, every variety of fever with every combination of symptoms has been repeatedly under observation, and the most acute diagnostic skill fails to differentiate the recognized diseases. 2. It is impossible to say that ague may not develop into deadly typhoid, or the severest enteric revert at any time to a simple ague. By this latter is not meant the final intermittent of this equally with undoubted enteric, but the sudden, early, and unexpected collapse of symptoms and fever. 3. Intestinal lesions are present, it is believed, in all cases of continued fever at this station. 4. Many cases have a distinct history of being excited by exposure (chill or sun), and the enteric season is well defined just before, during, and immediately after the rains,—in other words, when susceptibility to chill is at its highest. Without again entering into the question of etiology; without inquiring into the immunity of women, children, and natives; without noticing the evil repute of some cantonments compared with others similarly circumstanced in a sanitary sense, I venture to think that these cases and these figures suggest reasonable doubts as to the specific nature of this disease. May I, therefore, appeal to my brethren either to hold an open opinion for some time longer or to prove or disprove my arguments? The ulcers or other changes in Peyer's and the solitary glands may or may not be identical with the lesions universally known as typhoid; their presence or absence in no way affects the theory above set out. The character of these changes is, however, a most important branch of the subject, and calls for early and thorough investigation, and I readily admit that my case is incomplete until this is done." These somewhat vague propositions beg the question of etiology, and cannot be regarded as being warranted in the present state of knowledge in regard to the specific causation of the fever under consideration.

F. H. Welch²⁰⁶ *May* comments on some points in enteric fever as illustrated by the Army Medical Report for 1886 and the annual report of the Sanitary Commissioner with the Government of India for 1887. Fourteen stations occupied by British troops, and in every quarter of the globe, are noted, and all return enteric fever

except Canada and West Africa. The admission ratio varies from 66.3 per 1000 of strength in Egypt to 1.0 in the West Indies; the United Kingdom giving 1.6, Gibraltar 36.7, India, 15.2 in 1886 and 12.7 in 1887. The death ratio ranges from 21.79 per 1000 of strength in Egypt to 0.46 in the United Kingdom; Cyprus gives 7.86, Gibraltar 6.04, Bermuda 3.26, India 4.57 and 3.76. The mortality ratio was 45 per cent. in Cyprus, 32 in Egypt, 29 in Great Britain, 28 and 29 in India, 16 in Gibraltar. Comparing the army stations one with another, it is apparent that some other countries were worse off than India in disease causation, and worse off in mortality, relatively to their effective army strengths, while the ratio of mortality to cases treated was not greater in India in 1886 to 1887 than in Britain in the first of these years.

The statement that "it is the most fatal of all the diseases to which the British soldier in India is liable" is universally applicable; 312 deaths in India in 1886 is certainly appalling, yet there were 241 in Egypt in the same year, and the large number in India is due solely to the amassing of troops here, as the ratios show.

Enteric Fever in Infancy and Childhood.—An infant of 11 months was proved to have enteric fever by the discovery of the microbe of Eberth in the dejections. ¹⁵² _{Apr. 16; July} ¹¹²

Boobyer, Medical Officer of Health, Basford District, ² _{Jan. 26} reports the case of infection of five out of a family of eight persons, through an infant of 8 months, which had been removed from the breast of its mother. Shortly after the latter was found to be suffering with enteric fever. The child was restless and had constant diarrhoea, but the true nature of its complaint seems to have been unsuspected.

In a case of a child about 10 years of age there was nothing unusual until the fever subsided, in the fourth week, when purpura haemorrhagica supervened. ⁴³ _{Sept.} There was bleeding from the gums, from the nose, and finally haematuria. The purpuric spots appeared first on the feet and legs, then on the arms, then on the trunk, then in the sclerotic.

Read ¹⁵⁷ _{Oct.} reports and analyzes 22 cases of enteric fever in children between $4\frac{1}{2}$ months and 10 years.

T. C. Eberth ⁵⁰ _{May 3} reports the following case: A woman aged 30, in the fifth month of pregnancy, was taken with typhoid fever and miscarried. The foetus was at once subjected to a most careful

examination, and in the cardiac blood, as well as in the secretions of the lungs and spleen, the bacilli were found. Strange to say, none were discovered in the liver. Those procured were transferred to cultures and developed further bacilli. Eberth's view that these micro-organisms were true typhoid bacilli was supported by the opinion of other eminent bacteriologists.

Castelain¹⁸¹ _{Oct. 11, Nov. 8} has made a careful study of enteric fever in children. The majority of cases tend toward recovery. He begins treatment with a mild purgative, resorts to cool sponging for the mitigation of fever, and administers quinine, or, in default thereof, antipyrin. Tonics and alcohol are given according to indications. Later, he increases the frequency of sponging or makes use of luke-warm baths (30° to 32° C.—86° to 90° F.). Naphthol and bismuth salicylate are prescribed with a view to intestinal antisepsis. In the third period, he reduces the antipyretic medication, uses sponging only, and not baths. The amount of alcohol is increased. Pullna water or Hunyadi-Janos water is given to produce evacuation of the bowels, if necessary. Ataxic phenomena are combated with quinine or digitalis, the latter especially, if there be increased febrile action. Delirium is treated by musk, bromides, digitalis. Dry cupping is serviceable if there is any tendency to pulmonary congestion. Convalescence must be carefully guarded. If there is an elevation of temperature of 1 or $1\frac{1}{2}$ degrees after the ingestion of solid food, it may be considered normal and the alimentation be continued; but any sudden or great rise of temperature denotes some irritation, and the solid food must be withdrawn, and resumed only very cautiously and gradually.

Gillet³⁵ _{Jan. 11} advocates the following measures in the treatment of enteric fever in children. To reduce temperature, he wraps the little patient in blankets saturated with a solution of carbolic acid (30 grains—2 grammes), oil of thyme (10 drops), and vinegar (500 grammes—1 pint). Of antipyretic drugs, he prefers quinine, in doses of about 4 grains (0.25 grammes), to a child of one or two years; or salicylic acid may be used in the same dose with brandy, syrup of orange-flowers, and lettuce-water. Sore throat requires gargles of glycerin and borax; stomatitis, potassium chlorate. If diarrhea exists he washes out the intestine with a solution of boric acid in boiled water (3 per cent.).

To check the diarrhoea he uses an injection of:—

Infusion of chamomile,	f. $\tilde{\jmath}$ iss (50 grammes).
Starch,	$\tilde{\jmath}$ j (4 grammes).
Or lime-water,	f. $\tilde{\jmath}$ iss (50 grammes).
Laudanum (Sydenham), for a year-old child, . . .	gtt. ss.
“ for a child of 2 or 3 years, . . .	gtt. ij.

Against cerebral excitement he uses camphor, musk, sodium, bromide, or chloral. An infusion of roasted coffee is useful in severe cases as a stimulant, and is well liked by children. During convalescence he insists on regular alimentation, tonics, quinine and iron, wine, and aromatic, stimulating baths.

Treatment of Enteric Fever.—Harley, in his Lumleian lectures, ⁶ urges more than expectancy in treatment. To restore the functions of the skin and assuage thirst, he advises 50 grains (3.24 grammes) of ammonium citrate with 20 minims (1.23 cubic centimetres) of aromatic spirits of ammonia, either in plain water or with 20 grains (1.30 grammes) of sodium bicarbonate and a table-spoonful or two of lemon-juice as an effervescent draught, every three or four hours; large, hot, flaxseed poultices to the trunk, especially to the abdomen, and alternately to the back or front of the chest, where they may also prevent pulmonary complications. He deprecates both hot and cold bathing, believing that the latter increases internal congestion; and he casts doubt on the significance of Brand's statistics. Generally speaking, the percentage of recoveries will always show some relation to the time the patient first came under medical care. Thus, in his own statistics, with an average death-rate of 11.2 per cent., among those seen in the first week mortality was only 2.7 per cent., while among those first seen in the fourth week it reached 33 per cent., and of those seen later than the fifth week 43 per cent. died. Among his recoveries, 125, or more than half, had a temperature of 104° F. (40° C.) and upward. The moderate use of alcohol is beneficial.

Jaccoud ²⁴ _{Aug 4} employs the following method of treatment of enteric fever in the wards of La Pitié. In order to maintain the strength of the patient and to secure an abundant diuresis, he gives from 1 to 2 litres (1 to 2 quarts) of milk daily, supplemented, when necessary, by bouillon and red wine. In pronounced adynamic cases he administered from 4 to 8 ounces (124 to 248 grammes) of brandy in every twenty-four hours, together with 4 grammes (about 1 drachm) of the extract of quinqua and 6 grammes (about 1½ drachms) of acetate of ammonia. As a

means of reducing the temperature, he sponges the whole body with a mixture of cold water and aromatic vinegar four times daily for a temperature of 39° C. (102.2° F.), six times daily for a temperature of 39.50° C. (103° F.), and eight times daily for a temperature of 40° C. (104° F.). When pulmonary complications present themselves he applies from thirty to forty dry cups upon the inferior extremities, repeating this, if necessary, night and morning. As accessory medicines, he uses salicylic acid, quinine, and digitalis, the first two as antipyretics and the last named as a cardiac stimulant.

Jaccoud³⁵ _{Dec. 20, 1888} exhibited a patient who had recovered from enteric fever, despite the existence of chronic cardiac lesions (endocarditis of mitral orifice, slighter endocarditis of aortic orifice, and pericarditis). He attributes the exceptional result to the treatment instituted, which consisted, in addition to the usual treatment of *dothiénen térie*, of the administration of quinine hydrobromate. Salicylic acid was interdicted on account of the existence of a bronchial catarrh. When the symptoms were aggravated the quinine hydrobromate was suspended on account of the enfeeblement of the pulse, and infusion of digitalis given.

Bouchard¹⁶⁴ _{June 6} gives, at the beginning of enteric fever, during each of four days, 5 pills of calomel, of 2 centigrammes ($\frac{1}{3}$ grain) each. Whenever rectal temperature exceeds 40° C. (104° F.) he begins cool baths; first, at a temperature of 2 degrees less, reducing it every ten minutes till the temperature of the bath falls to 30° C. (86° F.). The number of baths is eight in twenty-four hours. If the bath does not suffice to reduce temperature to 37° to 37.5° C. (98.6° to 99.5° F.), he gives quinine sulphate in doses of 2 grammes (31 grains) in twenty-four hours, at first; gradually reducing to the quantity needful to maintain temperature at 37° C. (98.6° F.), morning, and 38° C. (100.4° F.), evening. For intestinal antisepsis he prefers, above all, naphthol; 5 grammes (77.16 grains) of this, with an equal quantity of bismuth salicylate, being divided into 10 powders, of which 1 is given every hour. If constipation is present, magnesium salicylate is substituted for bismuth.

Burt,¹ _{Mar. 2} in an article on the prevention and treatment of enteric fever, emphasizes the necessity of thorough disinfection, and urges protection of water- and milk- supply. Predigested milk he considers the best food for the patient, who must, in addition,

be given sufficient water. Alcohol is exceedingly valuable, but may sometimes be withheld with benefit. Antipyrin is productive of so much cardiac weakness that it is a serious problem if it should ever be administered in enteric fever. The application of cold water, in the form of a tub-bath, has, he thinks, dangers which require caution in the selection of cases, but the milder expedient of sponging with tepid water has much to commend it.

N. S. Davis, Jr.,⁵⁹ gives a very complete review of the mode of action of antipyrin in enteric fever, and concludes that it has no beneficial effect whatever. The mere lowering of temperature which it accomplishes is not desirable, when brought about by the action of a drug which does not favorably modify the underlying pathological process; while its untoward effects, in depressing circulation and checking the secretion of urine and the elimination of urea, are in marked contrast with the stimulation of nutrition, of circulation, and of excretion of urine resulting from hydro-therapeutic measures.

Buchman⁵⁹ advocates flushing of the colon. He thinks that from 1 to 3 quarts of cold water can be easily and safely passed into the colon, which will rapidly lower a high temperature. Some of this water passes the ileo-cæcal valve and enters the small gut. Tympanitic distention always disappears with the passing away of the water so injected. Putrefactive fermentation of the bowel contents is prevented by such use of water,—an important point, as toxic substances are more readily absorbed by the cæcum than by any other portion of the intestinal canal.

Backhaus⁶⁹ reports Mosler's results in treatment by intestinal injections of tannic acid,—an expedient which was suggested by the beneficial results recorded by Cantani from its use in cholera. The indications in both diseases are the same, viz., diminishing bacillary propagation and combating the toxicity of the ptomaines. Mosler begins with a solution containing 2 grammes (31 grains) of tannic acid to 2 litres (2 quarts) of water, increasing the amount later to 10 grammes ($2\frac{1}{2}$ drachms). The injections are administered, with the patient in the recumbent position, twice daily. Backhaus's statistics show that the febrile curve is not influenced, but the profuse diarrhœa is completely controlled or beneficially modified.

Bartlett²⁶⁷ recalls attention to the plan proposed by Kalb, of Thalmässing, for aborting enteric fever in cases seen before the ninth day. It consists of the inunction of mercurial ointment,

1 grammie (16 grains) every night, rubbed into the thighs and abdomen alternately for six nights, for half an hour each night. Calomel and opium pills are given according to the state of the bowels, and alcohol is advised to be given methodically, though the author has not adhered to this. In all cases where he was clear as to the date of the disease, temperature fell to normal in two or three days, and in five or six days from the commencement of the treatment all other symptoms had disappeared.

J. Michell Clarke¹⁵ Dec., '88 reports 7 cases of enteric fever treated with β -naphthol. It was given in small, frequent doses suspended in milk, and a small quantity of pure milk was administered after each dose. It may be given in gelatin capsules, or the following formula be made use of: Rx β -naphthol, gr. xx (1.30 grammes); tr. aurantii, f₃ij (8 grammes); syr. limonis, f₃ss (16 grammes); mucilaginis tragacanthi, f₃ij (93 grammes); aquam, ad f₃vj (185 grammes). Dose, f₃j (31 grammes). The patients' ages varied from 10 to 32 years. Four cases, of whom 2 were boys of 12 years, took 3 $\frac{1}{4}$ grains (21 centigrammes) every two hours during the course of the disease, until the temperature remained normal, for five or six days. One boy, aged 10, took half that dose. In 10 cases the drug was discontinued on account of interference with digestion. In addition to the β -naphthol, acetanilid or phenacetin was given whenever the temperature exceeded 102° F. (38.88° C.). The author concludes that the production of intestinal antisepsis is a rational mode of treatment in enteric fever, and that β -naphthol is a safe and tolerably efficient agent for this end; that by its use in the above cases the duration of the disease was shortened, and the intensity of the symptoms directly arising from profound disturbance in the alimentary canal was lessened; that the tendency to splenic enlargement, albuminuria, and septicaemic complications is diminished; that convalescence is more speedily and satisfactorily obtained, and, through disinfection of stools, there is less risk of the propagation of disease. In some patients gastric disturbance may be excited, preventing continuance of its use.

Petteruti⁵³⁷ No. 10, Feb. 2 concludes that naphthol may be administered in doses up to 60 grains (4 grammes) daily. The only unfavorable symptoms observed were a burning sensation felt while urinating and a dark-brown discoloration of the urine. Diarrhoea was rarely observed. Temperature was reduced and did not again rise, even

after the remedy was withheld. With children under 4 years of age, the author began treatment with daily doses of 15 grains (1 grammme), and never exceeded 30 grains (2 grammes). Adults were given four doses of 8 grains (52 centigrammes) each for the first few days, and, later on, eight doses daily of the same quantity at intervals of one hour.

Testi, ^{Feb. 23} at the Congress of Medicine held at Rome in October, 1888, related his experience of thymol in more than 150 cases of typhoid fever treated in the hospital of Faenza. The results were most satisfactory. Temperature was reduced, tympanitis diminished, diarrhoea checked, and the putrid products usually found in the excreta notably lessened. The drug had also a marked effect in diminishing the excretion of urea. As it heightens blood-pressure, it has no injurious effect on the heart.

Prince ¹¹⁵ _{Oct.} reports on the use of salol in enteric fever. In those cases where the remedy was given from the first—that is, during the first few days—there was a fall in temperature in from twenty-four to forty-eight hours from 103° and 104° F. to 98° and 99.5° F. (39.46° and 40° C. to 36.6° and 37.50° C.), the temperature curve continuing at or near this point until convalescence was established, which was in from one to three weeks. The other symptoms of the disease were correspondingly modified. There was generally a continuance of tenderness, tympanites, scanty urine, offensive stools, muscular and nervous debility, headache, anorexia, the appearance of rose-spots, etc., but in a greatly lessened degree and of shorter duration than is generally observed. Salol may be given in doses of from 2 to 8, or even 10 grains (13 to 52, or even 65 centigrammes), every three or four hours, according to age of patient and severity of symptoms.

Day ⁶¹ _{Jan. 10, 26} reports a case treated with salol in which relapse occurred after an interval of six weeks, and recovery again took place during the administration of the same drug, to which he attributes curative virtues. [I have reason to believe, from personal observation, that salol is of decided value in some cases of enteric fever in maintaining intestinal antisepsis.—S. S-C.]

Tarbox ⁵⁹ _{Aug. 24} reports 16 cases treated with iodine and carbolic acid, with one death. Constipation was the rule in every case. Eight patients had temperature reaching or exceeding 104° F. (40° C.), 2 haemorrhage from the bowels, 3 one or more relapses

each; 1 was complicated with facial erysipelas occurring in the third week, 1 by suppurative synovitis of the left knee-joint.

Hydrotherapy.—Smythe¹³⁹ contributes a paper on hydrotherapy in enteric fever. Since publishing his last report, the author states that he has treated 51 additional cases, with two deaths, which, added to the 157 already reported with three deaths, give a total of 208 cases with five deaths. Of the two deaths reported in this series, both were treated with antipyretic medicines and no baths. In every case where the bathing was energetically used the patient recovered. Lacour²¹¹ reports a case of enteric fever occurring at the middle of pregnancy, complicated with marked albuminuria and eclampsia, in which recovery ensued under treatment with the cold bath. During convalescence, abortion took place.

The non-medicinal hydriatic treatment of typhoid fever is warmly commended in a recent paper by Fürbringer.⁴ The mortality in 155 hospital cases was 16,—that is, 10 per cent.,—which Fürbringer regards as low. No abortive remedy was used; neither calomel nor naphthalin,—which latter he regards as useless,—and medicinal antipyretics only in very limited and selected cases; good nourishment was given, with sherry, opium, and camphor, in threatening asthenia. The majority of the patients received a methodical, mostly mild, and individualizing bath-treatment, less as an antipyretic than as an excitant and dietetic (for refreshment of the nervous system, cleanliness, stimulation of the appetite, combating of hypostases, etc.).

Baruch⁵⁹ warmly advocates the Brand method of hydrotherapeutic treatment of enteric fever. The mortality in New York City, according to Board of Health statistics, from 1876 to 1885, was 41.28 per cent., while Delafield's hospital statistics for 1885 place it at 24.66 per cent. Antipyretic medication may render the patients more comfortable, permitting them, as Brand says, "to die with a normal temperature," but it does not decrease the mortality. Brand's now familiar statistics show the astounding reduction of mortality to 3.9 per cent. The cooling effect on the blood is a secondary, though not unimportant, feature of the cold-bath treatment. Its principal value is in stimulation of organic functions by shock to peripheral nerve-endings. Dilatation of arteries and superficial vessels, with diminution of blood-pressure and contraction of blood-vessels in the inner structures, forms part of

the febrile process. The effect of the cold bath is to reverse this condition, as has been demonstrated by Winternitz's sphygmographic investigations. The vivifying effect upon the nerve-centres produces a vigorous cardiac action, evidenced by slower and more-regular pulse and improved tension of the vessels. It improves appetite and digestion, enabling us to enforce a better nutrition. It deepens and slows the respirations, preventing stasis of bronchial secretions and obviating pulmonary complications. All the secretions are enhanced, the patient is refreshed and re-invigorated, and fights the battle for life with the chances in his favor. The author considers the various objections and obstacles likely to be encountered by the American physician in attempting to carry out Brand's directions, but urges that they be set aside and the method given faithful, intelligent trial.

Hunt⁴⁰ warmly advocates the cold-water method. Anuschat⁴¹ urges the employment of warm baths in place of the cold water, to which the patients often evince such a great objection that they refuse to re-enter the bath. He disputes Brand's doctrine that the good effect of the cold bath is due solely to the low temperature, as in that case it would be equally advisable in all acute fevers. Anuschat believes the beneficial effect to be due to the water rather than to its temperature, and finds confirmation in the results of 150 cases which he has treated with the warm bath. He administers three baths daily, from fifteen to twenty-five minutes each, at 95° F. (35° C.), if the temperature of the body is between 100.4° and 102.2° F. (38° and 39° C.); at 93° F. (33.88° C.), if the body temperature is 102.2° to 104° F. (39° to 40° C.), and at 90.5° F. (32.50° C.) only if the temperature of the body is higher than 104° F. (40° C.). In most cases a perceptible improvement takes place in three days, with decrease of fever, but the good effect of the warm-bath treatment is most plainly seen in the almost entire absence of secondary symptoms and the much shorter duration of the illness. Of 150 patients, 145 were less than four weeks confined to bed, and most of them less than twenty-one days. When the temperature of the body falls below 99.5° F. (37.50° C.), the bath is administered less frequently. The other treatment—medicinal, dietetic, and stimulant—recommended is much the same as that generally prescribed.

Bataille²⁰³ compares cold affusions with baths after the

method of Brand, and believes that the former are fully as useful as the latter and less difficult to practice. The affusions during the first days are made every two and a half hours with three or four bucketfuls of water. The patient is lifted from his bed like an inert mass and placed in a squatting position in a tub. He receives the water without manifesting any sensation other than a somewhat sobbing respiration. After each affusion he is rapidly dried. Being replaced upon his bed under a single cover, he is allowed to drink a little vinous water. In the intervals between the affusions the salutary action of cold water is kept up by means of cold compresses placed upon the head and abdomen.

Extreme weakness and cardiac depression in enteric fever were successfully treated with cocaine, of which the patient took $\frac{1}{6}$ grain every six hours for nearly a week. ⁶² _{Feb. 15}

Convalescence.—Woodbury ⁶² _{Feb. 1} considers the different preparations of coca especially valuable in convalescence from enteric fever, being superior to digitalis, for instance, in not having a tendency to cause diarrhoea. Hutchinson ¹¹² _{Jan.} finds a too early return to solid food prejudicial to the patient. He continues the exclusive milk diet for three or four days after complete defervescence, or adds only animal broths. Then he gives soft-boiled eggs, the juice of rare meat, with milk toast and other farinaceous articles. At the end of a week the soft parts of oysters and fish are added to the dietary; at the end of ten days, the light meat of broiled chicken; at the end of two weeks, butchers' meat. All these articles of food are given in small quantities at first.

TYPHUS FEVER.

Mixed Infection—Typhus and Enteric Fevers.—Nixon ²² _{Aug. 7} reports a clear case of coincident typhus and enteric fever, with death and post-mortem examination. When seen on the date of his admission the patient presented most of the ordinary symptoms of enteric fever; diarrhoea, epistaxis; a well-marked crop of raised rose-colored spots visible over the front of the chest and abdomen, sparsely scattered, and not marked upon the posterior aspect of trunk; enlargement of the spleen determinable by palpation; moderate distention of abdomen, but no marked tenderness or gurgling over ileo-cæcal region. The physiognomy was that of enteric fever; there was a clear eye, with absence of conjunctival congestion, and

the patient seemed bright and cheerful. The tongue was more thickly and uniformly coated than is usually seen in typhoid. There was some headache of a frontal character. The pulse was 100, the temperature 102.6° F. (39.22° C.), and the respiration 24 in the minute. The diagnosis made was enteric fever. Nixon did not see the patient till two days later, when he found profuse maculation. The spots were so thickly clustered upon the face as to resemble a case of measles, and they appeared profusely upon the trunk and parts of the extremities, especially upon the back of the wrists. The rose-spots noted two days before were still to be seen, raised, and contrasting by their color with the darker spots which surrounded them. The condition and aspect of the patient had changed considerably. He was dull and stupid; the conjunctivæ were suffused, and the tongue had become dry and brown along the centre. Diarrœa was still persistent, and the stools were perfectly fluid in consistence, but of a dark-brown color. There was a tendency to delirium of a low, muttering character, but only existing at night. The course the case ran was markedly that of typhus,—increasing stupor, typhomania, maculae changing into petechiæ, progressive dryness and brownness of the tongue, sordes upon the teeth, and signs of failure of circulation. On the twelfth day of the disease sudden change took place in the patient's condition, which had been fairly satisfactory. There was chill, profuse sweating, temperature 105° F. (40.55° C.), pulse 102, respiration 36. The temperature steadily rose, reaching 106.8° F. (41.55° C.) in the course of three hours, and the patient died of exhaustion. Autopsy: Dark-purple discoloration of posterior part of trunk; patchy discoloration of extremities; muscles of dark-red color; blood black and fluid; heart soft and flabby, cavities nearly empty, containing merely small quantities of discolored fibrin; lungs anaemic anteriorly, posteriorly almost airless, filled with dark blood, giving deep-purple color; liver apparently normal; spleen enlarged, weighing 15 ounces (466 grammes), and putrid. Intestines: Solitary glands of ileum considerably enlarged, some distinctly infiltrated; Peyer's patches swollen and infiltrated; enlargement progressively marked toward ileo-cæcal valve; no trace of necrosis or ulceration; in cæcum and first part of colon, spots of intense hyperæmia, giving a bright, variegated appearance to mucous membrane; in the middle of such spots, enlarged glands, some of

which were ulcerated. Nixon traced the early history of the case, arriving at the conclusion that typhus rash appeared upon the fifth day of the disease, and that death occurred on the twelfth day.

Complications.—Christie²¹³,₂₈ reports an interesting case of typhus fever in a child aged 9. She was taken ill February 29th, with headache, nausea, vomiting, and pain in the abdomen. On the 6th of March a slight cough was noticed. On the 7th she was admitted to the City of Glasgow Fever Hospital, with a temperature of 98.6° F. (37° C.). Blood was then trickling from the mouth; an hour later she vomited about 2 pints of blood; complained of pain in the epigastrium, and extremities felt cold; weakness or stupor. On the 8th of March, morning temperature was 102° F. (38.88° C.). About 7 A.M. she again vomited about 2 pints of blood. In the evening the temperature was 98.2° F. (36.77° C.). Pulse scarcely perceptible; extremities cold; great restlessness,—*subsultus tendinum*. Death occurred that night. There was constipation throughout the illness. The rash of typhus was observed during life. The following is the report of the post-mortem examination. External appearances: There is a petechial rash over the body. Heart: Vessels on surface engorged; substance pale and flabby; the right side is full of blood, but the left contains little; the blood is perfectly fluid, and no clots are seen. Lungs: The posterior part of the left lung has a deep-purple color, and there are several areas of condensation in it. The right pleural cavity is obliterated by firm adhesion. A few indurated areas are felt in the right lung. Stomach: Contains some coffee-ground matter. There is no breach of surface of the mucous membrane, but there are numerous dark-colored points all over, corresponding with the orifices of the gastric glands. The small intestine, and more especially the ileum, contains a quantity of tarry-like matter, apparently altered blood. The large intestine contains a smaller quantity of the same. There is no ulceration of the Peyer's patches nor of any other part of the bowel. Liver, spleen, and kidneys are normal. Bladder distended slightly above pubis. Brain not examined. On 9th of March this girl's sister was admitted to hospital, and she proved to be a well-marked case of typhus. The father was said to be recovering from an illness at home. These facts, then, point to this being a case of typhus complicated with haemorrhage from the mucous surfaces. Haematemesis is noted as an

occasional complication of typhus by Murchison, and he mentions 7 cases of this kind, with 2 recoveries. Four of the cases occurred in his own practice; the other 3 were noted, respectively, by Gairdner, Russell, and Perry.

Hlava⁸² studied the typhus epidemic of 1888 in Prague. He examined the blood in 8 cases, the urine in 1, and made 33 autopsies. In 20 cadavers he found streptobacilli; in 7, streptococci; both these organisms in 2 bodies. *Staphylococcus pyogenes aureus* was found but once. Three examinations gave negative results. The streptobacillus was isolated and studied. It appears to be a hitherto undescribed organism, and its characteristics are given at length. It was not found in any organ except, perhaps, the spleen. It was generally found in the blood. Experimental inoculations produced fever in animals. The author believes it to be the agent of a secondary infection.

Statistics.—Seliger⁴ reports on the epidemics of typhus at Königsberg, Prussia, in 1880, 1881, and 1882, as recorded at the city hospital. Of 672 cases, 513 (76 per cent.) occurred in males, 159 (24 per cent.) in females; 67 were vagrants, 36 prisoners, 31 paupers. Of the others, statistics as to residence are given which require a knowledge of the localities to understand. Certain streets and certain houses in these streets furnished a large contingent of the cases. These houses are tenements in which the poor were herded together, often as many as four families in one little apartment. Concerning the category of laborers and mechanics, it is to be remarked that the patients did not belong to a settled population, but were of the wandering class. Most of them were "on the road, shelterless, sent from police stations or from prison." Despite carbolized baths and inhalations, four of the medical attendants were attacked during the epidemic; among the first, the resident in the surgical ward, who did not come into immediate contact with the patients. The mortality was 76 males (14.6 per cent.) and 21 females (13.3 per cent.): total, 97 (14.43 per cent.). Comparison of cases and mortality, according to months, is given, and the author explains the beginning of epidemics in winter, their increase in spring, and diminution in summer, by the movement of the crowds of poor people into and out of their miserable dwellings at those seasons. Morbidity and mortality ran parallel. Attention is called to the correspondence

between epidemics of typhus and of relapsing fever. That there is no antagonism between the two diseases is shown by the fact that four patients with relapsing fever contracted typhus in the hospital. Recurrence of typhus and second attacks were noted in 13 cases.

MALARIAL FEVERS.

Etiology.—Several valuable contributions have been made to the study of the haematozoa of malarial fevers. Celli and Guarneri^{54, 55} published a very important contribution reviewing the work of Golgi, Councilman, Kenztsky, and Laveran. They classify the various forms of the parasite, so far recognized in malarial blood, under two stadia: (a) the amoeboid stadium, or the stadium of the plasmodium (Marchiasava and Celli); (b) stadium of the sickle-shaped corpuscle (cystic bodies I, II, III of Laveran and Richard). The amoeboid stage, in which the plasmodium goes through its intra-cellular life within the red blood-corpuscles, may be divided into two principal phases, the vegetative and the reproductive. The vegetative phase includes all the changes from the unpigmented form to that of the pigmented form which fills the whole red blood-cell. There appear to be two pigmentary substances; the one, which may be termed endoplasmic, is deeper colored and includes the granules and rods of the black pigment, melanin; the other, the ectoplasmic, occurs usually in smaller masses much lighter in color. It accumulates in the centre of the quiet corpuscle or as a round mass at the periphery. The authors describe a process of sporulation analogous to that of the coccidia and mycetozoa, and another process concerning which they are in doubt whether it represents genuine sporulation or simply a destruction of the pigmented plasmodium. The sickle-form stage is divided by the authors into three principal phases: First, the crescentic, or sickle-form figure proper; second, the rod, or spindle form; third, the ovoid form, or round, flagellated form. A difference is noted in their relative frequency in summer and autumn, the crescentic bodies being more abundant in the latter season. They are also more abundant in recurrent cases and in chronic cachectics. The authors have observed destruction of the parasitic organisms by the leucocytes. While not positively pronouncing upon the identity of the organisms of the two stadia, they deem it not unlikely. An important therapeutic point is that quinine, while active against

the first form, the plasmodium, may be perfectly harmless to the crescentic form; and, indeed, they have found that it is in those cases most rebellious to quinine that the crescentic form is most frequently found. Clinical observations show also a class of malarial fevers with tendency to spontaneous recovery. This must be attributed to phagocytosis.

Golgi,⁵¹ *Feb. 1* supplementing his previous observations, has studied the development cycle of the malaria parasite in order to determine the differential diagnosis between the endoglobular organisms of tertian and quartan fevers. He believes that the paroxysms of intermittent fevers are in direct relation with the development of generations of parasites; and that the different development periods of different broods are the conditions determining the differing periodicities of the recognized varieties of fever. He claims that the experienced observer can distinguish, by biological and morphological characteristics, those parasites which have a life cycle corresponding with tertian-fever periodicity, from those whose life cycle corresponds with quartan-fever periodicity.

In the development of the tertian-fever parasite three phases may be distinguished:—

1. In the blood examined some hours preceding a fever access, we find in the red blood-cells the so-called plasmodia of Marchiafava and Celli, of their minimal size, one-fourth to one-fifth that of a red blood-cell. Amœboid contractility is marked, and is one of the discriminating characteristics of the tertian-fever parasite as contrasted with that of quartan fever. Pseudopodia are actively sent forth, like an irregular system of septa in the red cells. The organisms contain little or no pigment.
2. In the course of the second day the parasites are observed to be larger, occupying one-half or two-thirds of the red globule. They have a better-defined outline and are much richer in pigment. Their amœboid movements are less active, though still more marked than can be observed in the similar phase of the quartan-fever parasite. The red blood-cells have suffered a marked loss of haemoglobin, and this destruction progresses until the outline is barely distinguishable, the parasite meanwhile increasing in size and in melanin content.
3. When all the pigment has been gathered into the middle of the parasite mass, a peripheral differentiation begins to show. At first the pigment-containing central mass is surrounded by an

unpigmented ring in which radiation occurs, finally dividing the ring into a number of small globular masses, which continue to encircle the larger pigment-containing corpuscle. These little whitish masses become more and more individualized and more distinctly separated from the central body. The red blood-corpuscle continues to become fainter, and at last disappears. While the ultimate stage is not definitely made out, it appears to be rupture of the central parasitic mass, setting free the pigment, while the new-formed, smaller cells invade the red corpuscles, beginning a new cycle of parasitic development. The author relates a case the obscure clinical features of which were explained by his discovery in the blood of the organisms of both quartan and tertian fever, those of the former being more numerous. In conclusion, he gives the following diagnostic points. *Biologic characteristics:* *A.* The malarial parasite of tertian fever completes its developmental cycle in two days; that of quartan fever in three days. *B.* The endo-globular amoeboid bodies of tertian fever show much more active amoeboid motion than those of quartan fever. In the latter these motions can be distinctly observed only in the first phase of their development, and never very readily. It is usually necessary to warm the preparation in order to excite them. With the tertian parasite, on the other hand, it is somewhat difficult to catch the ever-varying forms of the lively organism. *C.* The parasite of tertian fever decolorizes the red blood-corpuscles in an energetic and rapid manner, while in quartan fever the red cells retain their color in great degree up to the latest phase in their destruction. *D.* In quartan fever the affected corpuscles become shrunken, while in tertian fever, even when the normal corpuscles in the same preparations become crenated, the infected ones retain their regular outline, appearing even larger than normal. *Morphologic Characteristics:* *A.* In tertian fever the protoplasm of the parasite has a very much finer and more delicate appearance than in quartan fever. Its outline is more distinct. This difference is most marked in the first phase of both organisms. *B.* In quartan fever the pigment consists of much thicker rods and granules than in tertian. There is also a difference in coloration. *C.* In tertian fever the development is not so uniform and regular as in quartan fever, departures from the ordinary types being quite frequent.

Nikolai A. Sakharoff, of Tiflis,⁵⁸⁶ details some interesting observations on the hæmatozoön living in the blood of malarial patients. When examined just after a paroxysm, the blood proves to contain, in large numbers, peculiar amœboid bodies having enormous dimensions, some individuals being as large as twenty red blood-corpuses put together, or even still larger. The parasite consists of an extremely fine, light protoplasm, containing numberless dark, roundish, equally-sized, sharply-contoured, mobile granules, and a uniformly-grayish nucleus as large as one or two blood-corpuses. As prolonged (ten hours) observations show, the hæmatozoön may undergo a most curious transformation. At this or that portion of the parasite there appears a protoplasmic process, which subsequently separates itself altogether to transform into a bright, homogeneous, grainless body, with exceedingly fine outlines. The size of such bodies greatly varies. In course of time some of them penetrate into red blood-corpuses, increase in size, develop pigment granules, and gradually pass into the ordinary adult form mentioned above; while other bodies, having a smaller size, coalesce to form threads closely resembling the spirochæte of relapsing fever, and differing from the latter only in their being somewhat thicker, and in their performing comparatively slower, wave-like movements. The intra-corpuscular hæmatozoa (which are identical with Laveran's malarial parasite) are said to be best examined in the blood taken from the spleen on the second day of the patient's apyretic state.

Lucas⁶ _{Dec. 1, 1888} reports a case of remittent fever, with pneumo-pleuritic complication, in which Laveran's corpuscles were observed in the blood.

Pathology.—Kalindero³⁴⁵ _{May} has studied the variations in the number of blood-cells during impaludism. He finds them much diminished, the white cells especially falling, after a febrile paroxysm, from their normal proportion of 1 to 330 to 1 to 800, or even 1 to 1000. When the spleen is enlarged the anæmia tends to become permanent; but medication, especially with quinine and pilocarpine, will reduce the spleen and increase the number of blood-cells.

Diagnosis.—Neely⁷⁴ _{Jan.} reports 2 cases of malarial fever simulating puerperal septicæmia. Ferreira¹¹⁸ _{Mar.} reports on impaludism in children as studied at Rio Janeiro. It is rare to find any case

of acute or chronic disease in a child which is not complicated with malaria. The author treats at length of the various typical and atypical manifestations, which he groups as follows: 1. Thoracic (asthmatic, bronchitic, broncho-pneumonitic). 2. Gastric. 3. Intestinal. 4. Cerebral (eclamptic, comatose, delirious, meningitic).

Treatment.—Jaccoud¹⁷,_{Jan. 8} declares it to be an error to look upon the chill as the initial manifestation of intermittent fever. True, this is its apparent onset, but its real beginning is to be detected by an increased excretion of urea due to increased combustion. If the temperature be taken at rather frequent intervals, it will be found to rise, little by little, until, just before the chill, it reaches, say, 39° C. (102.2° F.). If the urine be divided into two parts, one comprising that of the twelve hours nearer the paroxysm, the other that of the twelve hours further from the paroxysm, the amount of urea in the former portion will be notably greater than that in the latter. The time elapsing between the real onset of the disease paroxysm, as shown by the urine, and the apparent onset manifested by the chill, varies with the febrile type. In quotidiants it is about two hours, in tertians six to eight hours, in quartans twelve to eighteen hours. This fact condemns the neurotic theories, and indicates a rational basis for the time of administration of quinine.

Assuming that six hours before the paroxysm is the best time for giving the drug, this will mean eight hours before the chill in quotidiants. In tertians the administration should be completed twelve hours before the expected chill; in quartans, fifteen to eighteen hours. The dose must not be improperly divided, so that one fraction has been eliminated before the other can take effect. If a gramme (15 grains) is judged necessary, it should be given in three or four doses, about fifteen minutes apart.

Joseph Jones, of New Orleans, La., collaborator, considers mercury, quinine, and arsenic the most reliable agents in the treatment of malarial fevers, such as are met with in the southern and southwestern States of the Union. Of these, quinine holds the first place. The indications may thus be formulated: (1) the arrest of the fever; (2) the prevention of the return of the fever; (3) the arrest and prevention of the characteristic lesions of the blood and organs; (4) the restoration of the blood to its normal condition; (5) the establishment of the normal functions of the organs affected by the malarial poison.

Ricchi ² _{Apr. 27} reports on arsenic in the treatment of malaria. He has been able to test it on a large scale, having been in medical charge of the officers and servants of the Adriatic railway system for several years. His experiments were made in districts where the disease was particularly rife. Of 2501 men on whom the method was tried, 579 were suffering from acute and 1384 from chronic malaria. The remaining 538 were free from the disease, so far as persons can be, who live with scarcely any hygienic precautions in places where it is endemic. In the acute cases arsenic was of little use, but it gave excellent results in the chronic cases, and in the others it seemed to confer immunity, or, if they contracted the affection, it was of a mild type and easily cured with quinine. The men put on flesh, and lost the pallid, cachectic look characteristic of dwellers in malarial regions. According to Ricchi, there can be no doubt that "the daily administration of arsenious acid increases the resistance of the organism to the action of the microbes of malaria." The treatment must be methodically carried out,—that is, the drug must be given in time and continued as long as may be necessary.

McLaughlin ¹² _{Mar.} believes that quinine is always indicated in haemorrhagic malarial fever. He gives it in free doses, and precedes its use, as in ordinary malarial fever, by one or more purgative doses of calomel, and is confident the physiological effects of the quinine are better obtained after the mercurial action. Nausea and vomiting call for the use of ice, small pieces of ice to be frequently taken. Failing in this, he would direct that hot water be sipped or drunk freely by the patient. Morphine sulphate, given hypodermically, will often quickly relieve the nausea and at the same time will relieve the restlessness which is so annoying to the patient. This remedy, however, is not without its dangers, and should be used sparingly, or not at all, in those cases which show a tendency to anuria. Diuretics of a mild character, those which do not irritate the kidneys, are valuable remedies. He has found that lager beer is one of the most valuable remedies of this class. It is efficient as a diuretic, without irritating qualities, a good tonic, safe stimulant, and fair hypnotic, and, above all, it is generally grateful to the patient and acceptable to the stomach when other remedies are not retained. Diaphoretics, especially when the action of the kidneys is sluggish

and the skin is hot and dry, are, he thinks, necessary to a correct treatment of this malady. Warm or vapor baths, warm packs, and the hypodermic use of muriate of pilocarpine are efficient agents. In the convalescent stages the continued use of quinine in small doses, with iron, and perhaps strychnine, is demanded. The manifest tendency to relapse, so characteristic of this disease, and frequently so fatal in its results, should never be forgotten. In a large majority of the fatal cases of haematuria, death has resulted from suppression of urine. When this condition has existed for forty-eight hours, death almost invariably is the result; hence the importance of not overlooking the kidney lesions of this disease. Digitalis is advised when the pulse is feeble, rapid, or dicrotic.

REMITTENT AFRICAN FEVER.

Robert Reilly, surgeon in the African Royal Mail Steamship Company,²⁶ states that African or "black-water" fever is more prevalent during a north wind, and follows definite geographical lines. Natives and Europeans are subject to it alike, more particularly in changing from district to district and from latitude to latitude. Among the chief characteristics may be mentioned a constant high temperature, intense bilious vomiting, and partial suppression of the urine, that voided being very dark or mahogany colored. He does not state whether it is albuminous or not. Pneumonia also occurs as a complication, and some observers have gone so far as to regard this as a favorable symptom, because they consider that it tends to counteract the tendency to cerebral complications, which are so common and so frequently fatal. He regards quinine as being inefficient as a prophylactic measure. In fact, he states that he has seen those who were in the habit of using quinine as a preventive suffer more from an attack of this fever than those who had been hitherto unaccustomed to using it in any form.

The treatment advocated consists in early purging and the subsequent administration of a mixture containing liq. ammon. acet., fʒij (62 grammes); spt. aether. nit., fʒj (31 grammes); tinct. hyoscyam., fʒvj (23 grammes); aquæ camph., ad fʒvijj (249 grammes); fʒss (15 grammes) every three or four hours. Salol or salicylate of phenol were tried with good effect in doses varying from 10 to 20 grains (0.65 to 1.30 grammes) every two hours.

Potions of lime-juice and effervescing draught were also administered. Fruits were given freely. The diet should be essentially light and nourishing, taken in small quantities at regular intervals. Quinine is useful as convalescence sets in.

TONKIN FEVER.

Boinet²¹¹ _{Apr. 21} has demonstrated what he believes to be a specific micrococcus in the blood of an Annamite coolie, the subject of bilious remittent fever contracted in Upper Tonkin.

Blanc²⁴³ _{Jan.} publishes an elaborate study of the bilious malarial fevers of Tonkin.

RELAPSING FEVER.

Peter¹⁵² _{June 4} lectured on what he terms relapsing fever in a number of Annamites, visitors to the Paris Exposition. No mention is made of examination of the blood, though the discovery of Obermeier is alluded to in the comments. It is difficult to determine from the report just what relationship Peter desires to establish between these cases, his "fever of fatigue," the "famine fever" (typhus?) of Ireland, and "yellow fever." At all events, he treated his cases with rest and nourishment. Fever ceased in about three days, but he expected a return. Icterus was present in all cases.

DENGUE.

De Brun⁹² _{Aug.} contributes a paper upon the so-called red fever (La Fièvre Rouge) of Syria in relation to the epidemic of dengue observed at Beyrouth during the summer and autumn of the previous year. The dengue fever, which by certain authors is also described under the name of red (scarlet) fever, appeared in epidemic form after a number of sporadic cases had occurred, in the latter part of August, developing a great intensity in the month of September, and in the course of four months had attacked the greater portion of the population of that city. It was not until nearly the end of December that the epidemic ceased. The author therefore had an opportunity to study a considerable number of cases. He thinks that the dengue of Syria differs very much from the dengue of intertropical regions, and that the fever, probably originating in the torrid zone, has a tendency to extend to regions more temperate. He believes that it menaces the meridional coasts of Europe. He calls attention to the extreme variability in the

course of the reported symptoms of dengue in various epidemics. At first he considered that the patients whom he saw were attacked with febrile gastric distress, but they presented an extreme weakness out of all proportion to the gastric symptoms. Intellectual effort and physical exercise were alike impossible. He can only compare it to the depression which he observed in certain epidemics of influenza.

He soon recognized that he was in the presence of an infectious malady, the great number of persons attacked, the rapid diffusion of the epidemic, which not only attacked the majority of the population of Beyrouth but spread with great rapidity over the whole coast of Syria, forcing him to this conclusion. The majority of the patients complained of exquisite pain principally localized in the head and lumbar region and the knees. Many of them presented a peculiar eruption followed by desquamation. He therefore concluded that the malady was an epidemic of dengue, a disease which, after varying intervals, appears in an epidemic form along the Phœnician littoral. The symptoms are studied in detail. The fever was very irregular, no two temperature-charts presenting the same appearance. The sole constant character was the sudden elevation of temperature at the onset. In a certain number of cases the liver was congested and the patients presented a slight ieterus. The spleen did not appear to be enlarged, nor was splenalgia observed. In a number of patients, a systolic murmur was quite manifest in the region of auscultation of the mitral sounds, but this murmur was transitory and did not persist during convalescence. The respiratory organs did not offer the least symptom to which attention could be attracted. The author separates his cases into the following clinical forms: (1) the complete form; (2) the gastric form; (3) the rheumatic form; (4) the cephalalgic form; (5) the eruptive form. The convalescence was remarkable for its length and for the state of weakness in which the patients remained for an indefinite time. Relapse was quite frequent, and it was not exceptional for the same patient to contract two forms of the affection in the course of the same epidemic. Certain patients appeared to be the subjects of a special predisposition, and succumbed once or twice to each invasion of the disease. Concerning the diagnosis, the author calls attention to the close resemblance of

influenza, but refuses that diagnosis on account of the absence of respiratory affections and the characteristic temperature. Concerning prognosis, it is certainly good, for he had not to register a single case of death which could, without doubt, be attributed to the dengue; but, again resembling influenza, it was liable to determine death in the subjects of previous diseases of a grave nature. In the way of treatment, he allowed his patients to drink *ad libitum* lemonade charged with carbonic acid. Sodium salicylate gave good results against the pain. The same may be said of antipyrin, which, in addition, diminished the fever and calmed the headache. Chloral was employed with success against insomnia, which resisted opium and its alkaloids. From quinine he did not perceive any benefit. During the disease the patient was allowed to drink grog and hot or cold bouillon at pleasure. During convalescence, eggs, chicken, and beef were added to the diet. Some interesting observations are added on the nature, history, and geographical distribution of the affection. Christoph, ⁵⁷ _{Oct. 20} DeBrun, ³ _{Mar. 6} and Flora, ³ _{Oct. 21} also contribute interesting articles on dengue. A Berlin correspondent ⁶ _{Oct. 15} quotes a description of the "daggeian fever" ($\Delta\acute{\alpha}\gamma\gamma\epsilon\iota\sigma\pi\nu\pi\sigma\tau\acute{\alpha}\varsigma$) of the Piraeus, and also the opinion of Hyrtl that it is identical with dengue.

VARIOLA.

May, ²¹¹ _{Feb. 24} in reporting a local epidemic of variola at the Hôtel Dieu (which apparently originated within the hospital, the first patient being a nurse who had not been outside for more than a month), strongly pleads for revaccination. Hoffman ⁸⁸ _{V. 14, No. 10} argues that as the infectious power of variola is most active in the stage of desquamation and comparatively feeble in the earlier stages, so too does the virulence of the disease communicated in the different periods vary. He would therefore isolate patients only after the eighth day, in order, first, to insure the vaccinated members of the family complete immunity by a comparatively harmless exposure, and, second, to infect the non-vaccinated members early with the mild form of the disease, rather than to expose them to the dangers, later, of the severe form. We reproduce this advice as a part of current theorizing. We do not indorse it. Prompt and thorough isolation of the sick and vaccination of every member of a household wherein the disease has appeared is a far better plan.

Its Association with Other Infectious Diseases.—Arnozan¹⁸⁸ _{Mar. 24} reports on the service of variola in the isolating pavilion of Pellegrin in 1888. There were 24 cases, of whom 22 had been vaccinated once, but only one revaccinated. In the latter, variola developed eight days after the second vaccination. The successful character of the second vaccination was capable of being made out by the usual characteristics at the point of inoculation. There is no doubt that the man was already infected with variola at the time of vaccination. In one case of recent syphilis this disease remained latent during the evolution of the variola, and, after the cessation of the fever of suppuration, resumed its activity so that syphilitic papules were noted amid the variolous crusts. In a child of 4 years measles occurred during convalescence from small-pox, and complete recovery from this took place while quite a number of the crusts of the original eruption were still undetached.

Treatment.—Lewentaner,¹¹⁶ _{Jan.} having previously lost all children affected with variola at Constantinople, used on the face, head, and neck of his 10-month-old daughter, a paste of carbolic acid (3 per cent.) in starch and oil of sweet almonds, applied by means of a linen mask. The trunk and extremities were frequently anointed with the following paste: Glycerin, 70; pure starch, 30; salicylic acid, 3. In addition, the following medication was employed, partly for local effect in the pharynx:—

R. Ol. amygdal. dulc.,	.	.	.	.	.	.	15.0	parts.
Syrup. aurant. flor.,	.	:	:	:	:	.	30.0	"
Aq. laurocer.,	.	:	:	:	:	.	10.0	"
Quinin. hydrochlor.,	.	:	:	:	:	.	0.3	part.

Solve in acid. hydrochlor. q. s. f. emulsio.

Sig.: Every quarter-hour to half-hour, several drops to be instilled into the throat while the child is recumbent.

Recovery took place, with scarcely noticeable cicatrices on parts not hermetically covered, as the upper portions of the alæ of the nose. Five other children were similarly treated with equally good results. The author claims that by this method the duration of the disease may be shortened, its intensity greatly diminished, and the danger of infection lessened.

Hartge,²¹ _{Nos. 3} in mild cases of variola, covers the skin with cold compresses, and on the exposed portions uses Weidenbaum's pomade (mercurial ointment, 1; potassa soap, 2; glycerin, 4). The inunctions must not be made so energetically or so frequently as to

cause mercurialism. In severe cases he uses, in addition, tepid baths, repeated once or twice daily. Medication is tonic and symptomatic. Jacobi⁵¹ _{Feb.} urges early vaccination and revaccination between the fourth and sixth years. In the treatment of children, among other measures, he advises frequent washing with cool or tepid water. Now and then an ether spray over sore parts will be agreeable. Superficial sores and those which yield an offensive odor should be treated with thymol, salicylic acid, or iodoform. O edema of the larynx or laryngitis may require intubation or tracheotomy at short notice. After disappearance of fever stage, the patient ought to be bathed every day, or every other day, and inunctions of fat made all over the surface until desquamation is complete.

Grandmaison¹⁰⁰ _{Dec. 1, 1888} contributes an interesting article on hæmorrhagic variola. He advocates the administration of hæmostatic medicaments such as perchloride of iron (30 drops in twenty-four hours), ergot (2 or 3 grammes—31 or 46 grains), tannin, Yvon's ergotin hypodermatically. For general stimulation he advises large doses of alcohol, with or without quinine, and ether in the form of syrup or hypodermatically. Oxygen may be given by inhalation, though Brocq prefers frequent oxygen-baths, so that patients may absorb from 1 to $1\frac{1}{2}$ litres (2 to 3 pints) per day. Excitation is combated with opium, chloral, or bromides; signs of collapse are an indication for ammonium carbonate or musk. When the general symptoms are intense, with nervous inquietude and inefficient cutaneous function, lukewarm baths are employed. If nervous excitation is marked or temperature high, the baths are cool. Mustard-baths are particularly useful when the skin functionates poorly. Pomades of boric acid or salol are used on the face and hands; antiseptic washes to the body generally. During convalescence antiseptic baths (boric acid) are used every two or three days.

Baudon⁶⁷ _{May 15} reports a case of confluent variola successfully treated with salicylic acid. Thrice a day the following pomade was applied to the face, limbs, and thorax: Vaseline, 225 grammes (7 ounces 2 drachms); salicylic acid, 10 grammes (154 grains). After which the following powder was applied: Talc, 250 grammes (8 ounces $\frac{1}{2}$ drachm); salicylic acid, 10 grammes (2 $\frac{1}{2}$ drachms). In addition, quinine sulphate was given in doses of 25 centi-

grammes (3½ grains) thrice daily, borated gargles were employed, and milk given at discretion. Recovery was perfect and the skin showed no vestige of the disease. The peculiar odor of the disease was not manifested.

Muselli¹⁸⁸ presented a young woman who had recovered from confluent small-pox without a scar on the face, which result he attributed to the local use of Lebœuf's "coal-tar saponine." [This is not very different from a 5-per-cent. emulsion of liquor carbonis detergens.]

Sellwood²⁰² states that in small-pox hospitals at Shanghai and Hong Kong quinine is given in 3-grain doses (20 centigrammes), thrice daily, throughout the disease. When the eruption is thoroughly established, an ointment composed of equal parts of citrine ointment and vaseline is applied over the whole body every few hours, the skin never being allowed to become dry and harsh. Pyrexia is controlled with aconite. The diet consists of light food and fruit. Stimulants are given only when peremptorily called for by shock or great prostration.

Ory³⁵ gives his results obtained with cocaine in the treatment of variola and varioloid. In an extremely severe case of confluent varioloid immediate improvement and arrest of evolution of the papules were observed after the patient had taken somewhat over 10 pastilles containing each $\frac{1}{2}$ grain (2 milligrammes) of cocaine.

Further treatment consisted in the administration of 10 drops of a 5-per-cent. muriate-of-cocaine solution, which dose was repeated four times daily; in less than ten days the patient was cured. In a second case of varioloid a cure was effected by the same method of treatment five days after the eruption first made its appearance. A third case of severe haemorrhagic varioloid healed without scars after five days' treatment. Also in 2 cases, occurring in children, a cure was effected after five and six days, respectively. The author administers to adults 10 drops of a 5-per-cent. solution four times daily; to children, four times daily, 8 drops of a 1-per-cent. solution. It is often difficult to make a positive distinction between cases of variola and varioloid, as the pustules dry up immediately after the application of the cocaine. The fact that cocaine is capable of neutralizing the variola virus in the infected body has led the author to believe that it can prevent infection of the healthy

organism, and that it should be used as a preventive remedy in the immediate surroundings of the sick-chamber.

G. Somma, of Naples, corresponding editor, writes us that A. Bianchi³⁷⁶ warmly recommends the aseptic treatment of small-pox, which consists (1) in rendering aseptic, as much as possible, the whole surface of the patient during the course of the disease; (2) in keeping aseptic the blankets which cover the patient, and the sheets on which he lies; (3) in keeping aseptic the atmosphere and the walls of the sick-room. The author says that by this method he cured 96 cases of small-pox (22 light, 15 very grave, 39 grave cases).

YELLOW FEVER.

Etiology.—Frank S. Billings⁷⁶⁰ attacks the accuracy of the researches of Sternberg, as well as those of Freire and of Gibier, and upholds the conclusions of La Cerdá and Babes as to the identity of the pathogenetic organism of the disease in question; at the same time disputing some of the morphological details of La Cerdá's description. He claims that he has demonstrated the identity of this organism with that of the Southern cattle-plague in the United States, but without asserting any identity between the two diseases. Gibier⁴⁰ details his bacteriological studies upon the causation of yellow fever, describing the bacilli, which he claims to be pathogenetic. He calls attention to the fact that in the cases in which autopsy took place early after death, as well in Havana as in Jacksonville, the blood, liver, spleen, and the kidneys have constantly been found free from microbes, and claims that this fact strengthens the theory he has supported, that yellow fever is an intestinal infection which must be treated from the very beginning with evacuation and disinfection of the intestines by means of such agents as bichloride of mercury, naphthaline, and tannic acid. M'Whorter⁶⁴⁷ gives some points of analogy between yellow fever in the human family and Texas fever in cattle; the analogies extending, he claims, to the peculiar and specific poison of each, to the method of distribution of the two diseases and their clinical history, and, finally, to the anatomical lesions observed after death.

Maxwell⁸¹ reviews the yellow-fever epidemic of 1887 and 1888 in Florida. He dissents from the opinion of Surgeon-General Hamilton, that the fever was introduced into Key West by the bedding of the Bolio family. He quotes the opinion of John

P. Wall regarding the Tampa epidemic, viz., that the fever was introduced there among fruit dealers who obtained their fruit from small boats plying down the coast, all of which visited Key West and, on returning, evaded quarantine. He places the greatest responsibility upon the unsanitary condition of the city of Jacksonville and other places where the disease became epidemic. The treatment which he pursues is, first, a hot mustard foot-bath; second, stimulating diaphoresis; third, a purge of castor-oil; fourth, quiet and diet. "The alkaloid quinine and citrate of magnesia, with orange-tea containing bicarbonate of soda and sweet spirits of nitre," he says, "are beneficial for the fever when remittent fever is suspected." The idea that black vomit is certain death is a fallacy. If not accompanied by nasal and intestinal haemorrhages the patients may recover,

Inoculation.—Gaston⁴⁰ _{June} defends Freire's inoculations and criticises Sternberg's report thereon. He says: "If it were a question of veracity between Sternberg and Freire as to the existence of a special yellow-fever microbe, it might be relegated to the domain of science, but it resolves itself now into a correct appreciation of facts by competent honest observers of the data presented." He translates a letter from Freire, which states that, in the epidemic prevailing at the time of writing, 2100 persons had been inoculated, of whom 1317 were persons recently arrived from abroad or from the Provinces, residing in Brazil some days or months and between one and five years. The mortality among these 1317 susceptible persons inoculated was only eight-tenths of 1 per cent., and of all inoculations this season only five-tenths of 1 per cent. The number of deaths among those not inoculated, from the commencement of the epidemic to date of writing, was 736. Granted that the majority of these 736 consists of individuals highly susceptible and comparing them with the 1317 who were inoculated, "it follows," says Freire, "that if these 736 had been inoculated only 6 among them would have died."

A correspondent,⁶¹ _{July 27} writing from Sao Paolo, describes the yellow fever in Brazil in the epidemic of that year. He states that of 630 persons inoculated by Freire at Camfinas, 3 only were attacked, and these in a mild form; and that of those inoculated in Santos by Barrata, after the method of Freire, a very insignificant number had yellow fever.

Diagnosis.—Stub¹⁵⁰ _{Sept.} treats of the diagnosis of yellow fever, basing his paper upon cases observed in the city of Brooklyn, at St. John's Hospital, and upon personal experience obtained in the year 1862 in Key West, Florida.

Cochran⁶⁷ _{July} calls attention to the importance of early diagnosis of yellow fever. Physicians who have no practical acquaintance with the disease almost always mistake the first cases for some form of malaria. He suggests that if a case of fever occur in a stranger, or in a traveler from an infected locality or from the neighborhood of an infected locality, it should be carefully studied from day to day until its character is decided, and an accurate record should be kept of the clinical phenomena observed. The pulse and temperature should be recorded twice daily, and, after the first day, the urine tested twice daily for albumen. The quantity of the urinary excretions should always be observed, so that any marked diminution may be promptly discovered. The symptoms most to be trusted as indicating yellow fever are these: (a) An initial fever of a continued or quasi-continued type, of three days' duration, with marked subsidence at the end of that time. (b) Want of parallelism between pulse and temperature, and, independently of temperature conditions, a subnormally low range of the pulse. (c) The appearance of albumen in the urine on the second, third, or fourth day. (d) Injection of the conjunctiva, stasis of the blood in the capillaries of the skin, yellow discoloration, and suppression of urine. In very mild cases the symptoms are so little marked that positive diagnosis may be difficult or even impossible. In cases of the severer but not malignant grade, the low pulse-range and the albuminuria are very reliable diagnostics. In Alabama, fever with black vomit may be accepted as yellow fever without further inquiry. The most misleading symptom is the discoloration, from which the disease gets its common name. Those not familiar with the disease think that every yellow-fever patient should be yellow; but the majority of patients do not show any decided yellowness at any stage of the disease. In the severer grade of cases it is not common before the third, or even the fourth or fifth, day. In a number of cases, even death may occur before the discoloration becomes marked; but in such cases the yellow discoloration appears post-mortem.

Diagnosis and Treatment.—Nelson⁶¹ _{Aug. 3} contributes a paper on

yellow fever based upon his experience in Panama on the Pacific and Colon on the Atlantic, both ports of the Isthmus of Panama; his studies and observations on the west coast of Mexico in 1885; his experience in the hospitals of Cuba; and his visit to Florida in the fall of 1887, when he forecast the epidemic which swept Jacksonville in 1888. In regard to treatment, he says that, on being called to see the patient at the outset, he made quinine a diagnostic agent, giving it in a solution containing dilute sulphuric acid, sodium sulphate, and compound tincture of cardamom. If the case is purely malarial the quinine and sodium sulphate meet all the indications. Every dose contains 15 grains (97 centigrammes) of quinine and half an ounce (15 grammes) of the salts. If after two days the temperature remained high (100° F.—37.77° C.—and upward) with the usual symptoms, yellow fever was the verdict. Later, he added to this treatment a phosphoric-acid mixture largely diluted with water, given every hour or two. To produce free sweating he resorted to vapor-baths, with the drinking of a pint of hot lemonade or orange-leaf tea. Nourishment was maintained by means of iced milk and beef-broth in very small quantities, at frequent intervals. The treatment was successful in 3 consecutive cases, nearly all cases treated otherwise having died.

Sternberg⁸⁰ records the results of an extended trial during the recent epidemics at Decatur, Alabama, and Jacksonville, Florida, of the treatment of yellow fever according to a method suggested by himself while at Havana. The formula referred to is as follows:—

R Sodii bicarbonatis, gr. cl (10.00 grammes).
 Hydrarg. chloridi corros., gr. $\frac{3}{5}$ (0.02 gramme).
 Aquæ puræ, Oij (1.00 litre).
 Fifty grammes (1 $\frac{1}{2}$ ounces) every hour. To be given ice-cold.

In Decatur were treated 32 whites, with 4 deaths; 32 colored persons, no deaths. This excludes 2 cases treated by Cross, in which the treatment was not commenced at the outset of the attack. One of these patients, a white male, recovered; the other, a white female, died. The general mortality among the whites alone was 30.92 per cent., the total general mortality being 29.22 per cent.; while in the total of 64 cases treated by the alkaline-bichloride method the mortality was only 6.45 per cent., and mortality among the whites, considered separately, 12.5 per cent. Deducting

from the total mortality the latter group, we find that the mortality of cases treated by other methods was 40 per cent. among the white and 20 per cent. among the colored population. From Jacksonville, records were received of cases treated at the Sand Hills Hospital by Sollace Mitchell, and of cases treated in private practice by A. J. Wakefield. Mitchell's statistics include 106 cases with 5 deaths, a mortality of 4.7 per cent.; 79 of the cases and all of the deaths were whites, a mortality of 6.3 per cent.; 27 cases were colored, with no deaths. Of the whites, 73 were males and 6 females. The deaths all occurred among the white males, and the mortality among these cases, considered separately, was 6.8 per cent. Yellow fever is well known to be especially fatal among adult males, and in hospital practice a mortality of less than 25 per cent. among this class of cases is exceptional. The general mortality, as shown by the daily records published in the newspapers, was nearly 10 per cent., but this calculation includes, in the total morbidity, negroes, of whom very few die from yellow fever. Mitchell reports the mortality among the white population as from 22 to 25 per cent. Wakefield treated 89 cases,—75 white and 14 colored. Five deaths occurred among the whites, a mortality of 6.6 per cent. Thirty-nine of the white cases were males and 36 females. Forty-one of the cases were classed as severe and 48 as mild. One of the fatal cases is said to have been a consumptive, another to have been convalescing and to have died from imprudence; concerning another the remark is made, "bad nursing, imprudence;" concerning another, "unfavorable surroundings."

Sternberg's object in suggesting the formula was to test a decidedly alkaline treatment from the outset of the attack, and also to render the highly-acid urine neutral or slightly alkaline, in the hope that the secretion would be somewhat more abundant and the tendency to suppression diminished. It appears to meet these important indications, and to save life by preventing those structural changes which give rise to haemorrhage from the stomach and suppression of urine,—two causes which are present in the majority of the fatal cases. Bichloride of mercury, in a comparatively small amount, was added to the formula, not with the idea that it would, to any extent, destroy pathogenic micro-organisms in the intestine, but as an antiseptic which might be useful in preventing fermentative changes in the stomach. The writer analyzes the

cases treated by the bichloride alone, according to the recommendation of Gibier, and a single series of cases in which sodium bicarbonate was administered alone. In both series the mortality was much greater than in those treated according to his recommendation.

Mitchell's experience with increased doses of both the ingredients from those of the original formula leads to the recommendation of the following modification:—

R. Sodii bicarb., 3iv (16.00 grammes).
Hydrarg. chloridi corrosivi, : : : gr. ss (0.03 gramme).
Aqua pure, Oij (1.00 litre).
Same dose as before.

It would be a mistake to substitute the potassium salt for the sodium in the above formula. The mercuric chloride, which remains in solution in the presence of sodium bicarbonate in the proportions prescribed, would be precipitated. Moreover, potassium salts are directly contra-indicated in any disease in which there is so great a tendency to suppression of urine and uræmic poisoning. Martinez^{73, 12} states that treatment of yellow fever according to the method of Sternberg, with sodium bicarbonate and mercury bichloride, reduced the mortality more than one-half at the Mercedes Hospital in Havana. When patients are treated from the first day vomiting rarely occurs. Diuresis is maintained to a marked degree even in the severest cases. After the eighth or tenth day it is necessary to suspend the sodium bicarbonate, and to give stimulants and combat the adynamia and hæmorrhages, etc., with the customary measures.

MILITARY OR SWEATING FEVER (LA SUETTE MILIARE).

Thionot⁹² publishes a careful study of a severe epidemic of miliary or sweating fever, which occurred in the Department of Vienne in 1887. The following subjects are passed in review: First, the clinical aspects of the disease; second, its epidemiological relations; third, the history of the epidemics which have occurred in France during the eighteenth and nineteenth centuries; fourth, etiology and nature of the disease. A good summary of the literature of the subject is given, embracing, in particular, the descriptions of the affection as observed by the various authors. Thionot's own observations bring into prominence the following facts: The attack begins with gastric distress and general discomfort, which may precede the other symptoms by several days;

but, in the majority of cases, a person apparently perfectly well will, during the day, complain of great fatigue and feebleness, and in the middle of the night be awakened by a profuse perspiration. The principal symptoms of the first period are perspiration, fever, general debility, and nervous phenomena of diverse nature. Among the latter may be mentioned dyspnoea, usually paroxysmal, and without any pulmonary lesion appreciable upon auscultation; a feeling of constriction in the epigastric region; great restlessness and delirium. Among the more infrequent are muscular cramps, especially in the muscles of the calf and the hand. The tongue is saburrall, and constipation is usual. The author would lay special stress upon two phenomena of the second period, which he thinks have been slighted by most authors, namely, cough and epistaxis. The latter may be quite profuse, and occur daily or several times a day. The eruption is generally manifested about the fourth day; very rarely it may appear on the second or third, or it may delay until the fifth or sixth. It is preceded by itching and persistent tingling, and, as a rule, all nervous phenomena are redoubled for the moment, to be mitigated when the exanthem appears. The eruption consists of two forms: 1. The miliary eruption, properly so called,—that is to say, a miliary papule which appears as a little acuminate point upon the cutaneous surface, and is slowly transformed to a vesicle, which discharges and finally exfoliates. 2. The exanthem, which is the substratum, the base of the miliary eruption. This may be classified into three forms: the rubeolar, which is composed of crescentic patches, more or less confluent; the scarlatiniform, where the cutaneous surface is of uniform coloration; and the amorphic or purpuric form, the cutaneous surface being tinged a dark red, which does not disappear upon pressure, and in which purplish patches are to be observed. In general, the eruption appeared first in rubeolar form, with plaques, which, becoming confluent, gave the scarlatiniform appearance, the color deepening and purpuric patches then appearing. Much irregularity is to be observed in this respect, the characters differing from day to day, even in the same individual. Under the name of *miliaris alba* may be described a special variety of the eruption, consisting of diaphanous vesicles upon a normally-colored skin. The sweating becomes less marked as the eruption progresses, the skin remaining moderately moist; fever is less active;

general debility and cephalalgia diminished. Nervous phenomena become quieted. The pulse-rate greatly diminishes, falling often to 55 in a minute; cough becomes more frequent, auscultation revealing bronchial râles; constipation persists. The stools are of the consistence and appearance of tar, and quite fetid. The urine, which at first was diminished, and in some cases totally suppressed for several hours, resumes its normal characteristics. Albuminuria is not to be found. Epistaxis continues in some cases, other haemorrhages being added. Haemoptysis occurred infrequently, but in several cases very abundant intestinal haemorrhages were observed.

The third period is that of desquamation, which process may take place discretely at separated points, or in large patches. The disease has virtually come to an end when the eruption appears, and usually about the eighth or the tenth day convalescence begins. This is uncertain and tardy. Recuperative powers seem to be in abeyance; nor is this condition in relation with the gravity of the case, for the most benign forms may have the most tardy and difficult convalescence. The convalescents present pronounced anaemia; very often there is œdema of the lower limbs; the muscles of the face exhibit fibrillary tremors; the tongue trembles after the fashion of the tongue of paralytics; insomnia, persistent anorexia, and a tendency to profuse perspiration upon the slightest exertion, are noticed. Among the rarer phenomena are rectal crises analogous to those of locomotor ataxia, crises of costal neuralgia, and irregularity of the heart. These phenomena disappear gradually, but it may be two months or more before the last trace of the disease has been effaced.

Previous authors have divided the disease into benign and grave forms, and Rayer distinguishes also an insidious form. Thoinot, following Brouardel, would specially discriminate only the two extremes, *i.e.*, the ambulatory form and the fatal form. The rapidity of the fatal form is extremely great. The author knows of many cases which terminated fatally in forty-eight hours, exhibiting the phenomena of profuse perspiration, hyperpyrexia, restlessness, sudden delirium, dyspnoea, and excessive epigastric constriction. In other cases the onset of the attack presents nothing peculiar, but suddenly, on the second, third, or fourth day, all of the phenomena are aggravated, and in a few hours the patient is dead.

Most frequently death occurs before the appearance of the eruption or coincidentally; so that those patients who have safely arrived at completion of eruption may be considered out of danger. Death after the fourth or fifth day is very rare. It has, however, occurred in a relapse after the disappearance of the eruption.

Among the anomalous forms of the disease are that without eruption and that without sweating. The coincidence of epidemics of miliary fever with cholera, on the one hand, and on the other with certain exanthemata, particularly roseola, scarlatina, and, to a less degree, variola and varicella, is carefully considered, and the diagnosis set forth at length. The study of the geographical distribution is extremely elaborate and complete. The author does not believe the disease to be transmissible by contact, but by infection. It is, in all probability, of microbian origin. The period of incubation may be very short,—less than twenty-four hours. The maximum period cannot be fixed. Neither age nor sex appears to have any influence upon susceptibility, but the disease manifests a curious predilection for the robust, as also for alcoholics. It is endemo-epidemic in France. It recurs in the same patient. It may pass from the mother to the foetus.

MALTA FEVER.

Bruce² defines malta fever as “an endemic disease of long duration, characterized by fever, continuous, remittent, and intermittent in type; in most cases, enlarged spleen, profuse perspiration, sudamina, constipation; relapses almost invariably; accompanied by pains of a neuralgic or rheumatic character, sometimes swelling of joints or orchitis; ending almost always in complete recovery; in fatal cases, enlargement and softening of spleen, congestion of duodenum and upper part of jejunum, no swelling or ulceration of Peyer’s glands, and the constant occurrence in various organs of a species of *micrococcus*.” The most appropriate name, according to an editorial writer,² is that of Veale, *febris complicata*. The same writer states that the disease declares itself gradually, with headache, sleeplessness, loss of appetite, and thirst, often without shivering or diarrhoea, and without spots. Symptoms of this kind, with more or less severity, last for three or four weeks. Apparent but deceptive convalescence then usually sets in, to be followed in a few days by a relapse, with rigors, intense headache,

and fever, with frequently diarrhoea. In this state the patient may continue for five or six weeks, with more or less delirium. Improvement again sets in, to be followed, it may be, by another relapse in about ten days or a fortnight, with shivering, headache, sleeplessness; great debility, with night-sweats; pains in the hips, knees, ankles, and elbows, and often in one or both testicles. Again the patient enters on a state of convalescence, which may last for a month or six weeks. The old symptoms may again appear, with extreme debility; a thickly-coated tongue, with thirst; a temperature ranging from 105° F. (40.55° C.) in the evening to nearly normal in the morning, with night-sweats, bringing no relief to the general distress. The rheumatic symptoms are the most constant and the most distressing; all the joints, large and small, may suffer. Veale describes cases in which the intervertebral joints, especially those of the lumbar region and the sacro-iliac synchondroses, were so severely affected that the patient "dreads every movement; he will lie for days in one position, risking the formation of bed-sores and resisting the desire to evacuate his bowels rather than encounter the suffering that a movement will entail. Oftentimes the tendo Achillis and the fibrous structures around the ankle-joint are involved; but perhaps the lumbar aponeuroses and the sheaths of the nerves issuing from the sacral plexus are still more commonly affected."

CYPRUS FEVER.

John G. Carageorgiadès, of Limassol, Cyprus, collaborator, communicates the following: "There can be but little room for doubt that amongst fevers which occur at Cyprus there is a continued fever of special kind, being neither enteric, typhus, or relapsing fever, nor malarial due to palus or paludal miasma. 'Cyprus fever' is a distinct form of a specific fever not recognized in the present nomenclature. This fever has a great resemblance to the continued fever of Malta and the Mediterranean fever."

WEIL'S DISEASE.

Fraenkel⁶⁹ _{Feb. 28} critically reviews the published accounts of cases of so-called Weil's disease, and reports a case due to an infected wound. The patient, a medical student 22 years of age, was cut upon the forehead while fencing, the right temple being also excoriated. The wound was antiseptically dressed and bandaged,

but the temporal excoriation was not protected. On his way home the patient wore a hat which had been kept in the dissecting-room. The wound healed nicely, and for two days there was no indication of trouble. Then occurred a chill, followed by high fever, with sleeplessness and delirium. In the course of thirty-six hours there was observed, surrounding the excoriated spot, an erysipelatous blush, which disappeared after forty-eight hours. Fever and delirium persisted. Restlessness gave way to somnolence and great prostration. Diarrhoea ensued. Icterus of a pronounced type was noted five days after the accident, the urine showing bile-pigment and considerable albumen. Liver and spleen were somewhat enlarged, the liver very sensitive to pressure. On the night between the eighth and ninth days of the disease the fever ceased by crisis and the jaundice and albuminuria disappeared coincidentally. The patient failed to gain strength, and a new febrile period began about eleven days later, lasting five or six days. Convalescence was prolonged. The author discusses the subject elaborately, and concludes that the symptom complex described by Weil cannot be regarded as a specific disease on etiological, semeiological, or anatomical grounds. It may result from various causes. "Infectious or septic icterus" is the name he proposes instead of "Weil's disease." Baginsky related a case in a child of $1\frac{3}{4}$ years. The autopsy showed normal brain; oedematous lungs, with slight atelectasis; normal heart-valves; large liver, moderately icterode; large, soft spleen; pancreas large and pale; large kidneys, the cortices broadened; gastric mucous membrane swollen; gall-bladder moderately filled and patulous; swelling of solitary follicles and Peyer's patches; no ulcers in the intestines. Microscopic examination showed normal liver-cells, but parenchymatous degeneration of the kidneys.

Goldschmidt³⁴ _{Apr. 16} considers at length the present evidence concerning Weil's disease. He reviews the cases of Weil, Merkel, Aufrecht, Wagner, Roth, Matthieu, Fiedler, Haas, Pfuhl, Hueber, Nauwerck, Brodowski and Dunin, and Fraenkel. He describes 4 cases of his own. The ages of his patients ranged from 22 to 24 years. They were all males. All recovered. In general terms, the phenomena presented were those of an acute febrile process, with severe nervous symptoms, enlargement of the liver and spleen, and albuminuria. The fever was of a remittent type, in

some cases intermittent, with relapse after periods varying from a few days to a week or longer.

F. Vierordt⁵⁷ records at length a case of febrile jaundice (Weil's disease) observed in 1881. Lemoine²⁶ questions whether there is really a morbid entity manifested by the assemblage of symptoms described by Weil and belonging to the typhoid type. Other articles upon the subject are those by Rendu, ³⁵ Miller, ² Aug. 3 Le Flaine, ¹⁰⁰ July 9, Goldenhorn, ⁴ Aug. 19 Benesch, ²⁴³ June Stirl, ⁶⁹ Sept. 26 Perret, ²¹¹ June 2 Barie, ³⁵ Sept. 12 Brodowski and Dunin, ³²⁶ B. 43, H. 45 Winnscheid, ³²⁶ B. 55, H. 1, 2 Chéron, ¹⁷ May 30 and Weiss. While there are many who contend that Weil's disease is a distinct affection, which might properly be called "essential febrile jaundice," the weight of opinion inclines to the view that a number of infectious processes of various origin, but similar in their symptomatology, have erroneously been included under one name, and that Weil's disease is not a nosological entity. As of interest in this connection, it may be mentioned that Jennings¹⁸⁵ May exhibited the gall-bladder and duct, with impacted calculi, of a man who died from acute obstructive jaundice, the case having been characterized by an intermittent fever of irregular type, and probably belonging to the class of cases described by Charcot as "intermittent hepatic fever." There had been no suppuration.

THERMIC FEVER.

Hodgdon¹⁰⁴ Dec. 15, '88 reports a case of insolation in a child of 4 years, treated by cold bathing and aconite, with recovery. Hume⁶ Apr. 29 reports a case of dyspnoea and depression of the heart's action, which he attributes to vagus inhibition, the result of heat stimulation. The patient was an officer, who had been marching all day in a hot Indian sun, the direction of the march being such that during the afternoon the left side of his head and neck were exposed. Three grains (20 centigrammes) of ipecac were given, with the result of relieving the symptoms and putting the patient to sleep. Breitung⁴¹ June 10 has studied the pathology and therapy of sun-stroke and heat-stroke. Prat¹⁹⁵ Dec. '78 reports what he calls a case of "electric sun-stroke." The patient had been engaged some twenty minutes in adjusting the screw which separates the carbon points of an arc-lamp, his face being held some 40 to 50 centimetres (15 to 20 inches) or more from the arc, and had neither covered his eyes with smoked glasses nor taken any precaution against

radiation. The current was 12 to 14 ampères, with a potential of 44 volts, and the lamp had an illuminating power of about 200 Carcel burners. Two hours and a half later the man supped with good appetite, and three hours after this went to bed and slept soundly, as usual. About midnight he was awakened by feelings of insupportable pain and burning in the face, and especially the eyes. He was unable to see, covered his eyes, and complained of great scorching, which was aggravated by the least access of light. The lids and conjunctivæ were red and swollen, with muco-purulent discharge. With pain he distinguished between light and darkness, but could not distinguish objects. The entire face was reddened, especially around the eyes. Recovery took place under the following treatment: Belladonna ointment around the eyes and to the lids; cold compresses to the eyes; occlusion; hot foot-baths; saline washes, with, later, the addition of Van Swieten's solution.

NEW, UNKNOWN, OR UNRECOGNIZED FEVERS.

A New Eruptive Fever.—Coltman, corresponding editor,⁶⁷³ Sept. describes a new eruptive fever that he observed in Chinanfoo, China. The patients had been previously affected with small-pox. For three days fever was manifested. On the third day small red spots appeared, first on the wrists, soon after on the face, after which the fever gradually fell, and in two days more, or by the fifth day, it had entirely disappeared. The eruption steadily spread over the entire body, maintaining a discrete form. It reached its height on the seventh day, at which time the papules were about the size of a pea, round as a bullet, and perfectly white. On opening several of them, they were found to contain a perfectly clear albuminous fluid. They then seemed to dry up, and in eight days more were all like little white, hard shot, resting upon an indurated base. The eruption was at no time pustular, umbilicated, or inflammatory. As the papules drop off, they leave a dark-blue base, still raised above the surrounding skin. The Chinese make no distinction between this affection and small-pox, which probably accounts for the numerous attacks of small-pox in the same subject within a few months, to which they allude.

Malignant Fever of Brazil.—Toppin,⁶⁷² May 25, reports two cases of a fever occurring at Rio Janeiro, which he believes has not yet been

properly named, and which in its malignancy outrivals any fever he has ever seen or heard of. A passenger from England to Buenos Ayres went ashore in Rio, and in about half an hour was brought back in a comatose condition, with a temperature of 110° F. (43.33° C.), and died within an hour. Before going ashore he had been in good health, but soon after landing complained of pain about the epigastrium, and in a few minutes became delirious and then comatose. He had been in the Tropics before,—in India and other climates even hotter than the Brazils,—and was more inclined to be anaemic than plethoric. The author applied ice to his head, sponged him with iced water, administered enemata of magnesium sulphate and water, made subcutaneous injections of antipyrin and quinine, and applied sinapisms to the spine and to the calves of the legs; but all to no purpose, there being no variation in the temperature, which remained high for some little time after the man was dead. The next case was that of W. H., aged 41, a first-class passenger from Monte Video to England, who came under treatment on the night of April 7th for something to open his bowels. Two podophyllin pills, followed next morning (April 8th) by a dose of Seidlitz powder, had no effect. It turned out that his bowels had not moved for several days, but otherwise he was what would be called a fairly healthy man. He had been dancing and playing cricket on deck only the day before, and had taken the precaution of not going ashore. Finding that the pills had no effect, Toppin gave him 2 glycerin suppositories of 30 drops each, and later 2 ounces of castor-oil per rectum. As none of these had moved his bowels, and as he had in the evening a temperature of 102° F. (38.88° C.), he was then given a mixture containing 1 drop of croton-oil and 5 drops of oil of peppermint; this moved the bowels three times. At 3 A.M. on the following morning (April 9th) he had a temperature of 105° F. (40.55° C.); the skin was very hot and dry, and the pulse 120, full and strong. The only thing he complained of was great weakness of the legs. He had no headache or pain anywhere, and could keep his legs stretched out with as great ease as in any other position. He had no lenticular rose-spots, gurgling or wincing on pressure over the right iliac region, or other sign of gastric fever. The author mentions this because fever was said to be prevalent at Monte Video, where he lived. His kidneys

were not acting very well, and the urine, when examined, was found to be albuminous. Antipyrin (Knorr's) was given in 20-grain (1.30 grammes) doses, increased to 30-grain (2 grammes) doses, at intervals of something less than an hour, for hours, without any perceptible effect on the state of the patient or diminution of the temperature. [Rather dangerous doses.—Eds.] Until a few hours before death the patient's mind was clear, although there was a tendency to delirium. Twenty grains (1.30 grammes) of quinine was given, followed by a mixture containing spirit of nitrous ether and nitrate of potash, without in any way lessening the temperature. Cold sponging of the surface of the body was also tried. Fairbairn, of Rio, was called in for consultation, and he pronounced the case to be one of yellow fever. At about 1 P.M. the fatal symptoms exhibited themselves—black vomit, hiccoughs, and subsultus tendinum. He had been covered with prickly heat; this now disappeared, and his skin became paler than usual, but there was no jaundice whatever. He soon became comatose, and died at 3 P.M., the body quickly turning a bluish black in mottled patches. Toppin remarks that the disease appears to be, like yellow fever, non-contagious, for the wife of the patient, who was quite overcome with grief, was in the cabin the whole time, and wiped his mouth with her own handkerchief; two or three other people were also in and out of the room. Whether it could be caused by the same morbid influence as yellow fever, acting on peculiar constitutions, is a question he leaves to those who are better able to decide; but the fearful rapidity and fatality of the disease, the absence of pain and jaundice, combined with the fact that the mortality from the ordinary cases of yellow fever during the epidemic has been much below the average, would, he thinks, point to its individuality. The blood seems to be so completely and quickly disorganized that treatment is of little avail.

Fever at Kansas City.—Lanphear¹⁰² Dec., '88 has a paper entitled "Have We an Undescribed Disease to Treat?" This disease prevails in certain localities of Kansas City, and has been called typhoid, typho-malarial, continued malarial, or cerebro-spinal. He saw several cases in one locality in the summer of 1887. The disease in these cases was ushered in with a severe chill, the only one. Temperature rose to 104° or 105° F. (40° or 40.55° C.). There was constant headache till near the end of the disease;

tongue moist and clean. There was considerable vomiting, with little nausea. It seemed to be cerebral in origin. Slight jaundice was noticeable. Urine was dark and ammoniacal, containing albumen, but no casts. Herpes and purpura were present. Pain in the muscles of the back and lower extremities, particularly in the gastrocnemius, was a constant symptom in all the cases. Motion aggravated the pain. The pulse was not much increased in frequency; the rate was 80 to 90, and soft. There was no abdominal symptom. The disease seemed to be infectious, and prevailed in summer in these cases. Post-mortem examination revealed little, except slight inflammation of common bile-duct and congestion or inflammation of the kidneys. There was no sign of disease of intestines peculiar to typhoid fever. The gastrocnemius muscle was infiltrated with what appeared to be serum. He thinks the site of irritation is in the ganglionic nervous system, the cerebro-spinal system being affected through sympathy only. His cases could not have been enteric, having had none of the symptoms. "They were also entirely dissimilar to intermittent fever, and the symptoms could be readily distinguished from malarial fever. Cerebro-spinal fever is the only one with which this disease could possibly be confounded, but the latter is much more grave. The symptoms approximate a disease known and described as 'Weil's disease,' which it possibly is. The tendency is to recovery." The treatment of these cases was that usually advised in fevers.

Fever on an Emigrant Ship.—Kraft³⁶⁹ No. 3 reports upon an epidemic of febrile disease observed upon an emigrant ship, voyaging from Norway to Honolulu, in the winter of 1880-1881. It began with symptoms of severe chill, or, like a mild enteric fever without nervous symptoms. The first stage lasted three or four days, after which were manifested great debility, loss of appetite, elevation of temperature to 39.5° to 40.5° C. (103° to 105° F.), with morning remissions. Physical examination of the chest showed nothing abnormal; sensorium, stools, and urine normal; tongue clean; no exanthem. The spleen was not examined. Some patients recovered in about ten days; others were sick for weeks, recovering with a gradual defervescence resembling enteric fever, or dying with symptoms of heart failure. One patient was jaundiced two days before death. Sequelæ did not appear. Twice as many

females as males were affected. The first patient was attacked about two months after leaving port. The disease might have been confounded with enteric fever, acute miliary tuberculosis, and pyæmia. The author, however, concludes it was none of these, and finds nothing in literature resembling it. It may be, he thinks, the "ship fever" of which old sailors speak. [But is that not typhus?]

Glandular Fever.—Pfeiffer³⁶⁶ describes, under the name of glandular fever (Drüsenvieber), a disease manifested by an acute, painful swelling of the lymph-glands in the entire region of the neck, a fever ranging between 39° and 40° C. (102° and 104° F.), a mild congestion of the fauces, and constipation. It lasts from eight to ten days. The prognosis is good, and the glandular swellings do not proceed to suppuration. The character of the disease is that of a house and family epidemic, and this would point to an infectious origin. The author leaves the question open whether his glandular fever is a distinctive disease or simply an abortive form of other well-known processes. Therapeutically, he employed oleaginous inunctions, wrapping of the throat in cotton, and rest in bed. In 2 cases Huebner observed nephritis.

Pleuro-pneumonic Fever.—Ballard²² publishes an interim report on an epidemic of so-called pneumonia at Middlesborough, which has resulted in the discovery of a specific affection to which he gives the name of "pleuro-pneumonic fever." At the outset of his inquiry he found that the fatality of the disease had been abnormally high, and that some of the local doctors regarded it as a new disease, whilst by the laboring classes its causation was put down to the inhalation of slag-dust. The epidemic lasted six months, and a curious point in connection with it was that the mortality amongst males was fourfold that amongst females. Its relation to age was also striking, the mortality at ages above 15 years being five times the mean of eight previous years, and that at ages above 45 five and a half times the mean. It was a very fatal disease, the mortality being over 20 per cent. at all ages and nearly 30 per cent. over 15 years. Ballard thus describes the chief clinical symptoms: Invariable commencement by rigors, pains in the side, increase of temperature, rapid pulse, dyspnoea, vomiting, and delirium. The cough was trifling, the sputa "prune-juice," and physical signs of pleuro-pneumonia were easily developed,

being either single or double. Relapses were frequent. Death occurred on the third to fifth day, and fatal cases seldom lived a week. In recoveries crises occurred on the seventh to tenth day, and embolic sequelæ often occurred. Pathological appearances included lobar pneumonia; pleural effusion; defibrinated clot in the right heart, but strongly-fibrinated clot in the left cavities; pulpy spleen; ecchymoses in the stomach. Further, Klein found a specific bacillus in the fresh lung-juice and in fresh sputum. Ballard considers this disease as a fever in the same way as typhus, enteric, and relapsing are considered to be fevers. Though hitherto unrecognized, he has some evidence of its existing elsewhere. He has strong proof of its infectious nature, by medium of individuals, specifically-infected drains, and infected food, which he undertakes to produce. The inhalation of slag- and other kinds of dust he regards as predisposing causes, only ranking with chills, bodily fatigue, and the like. General conditions of sanitary unwholesomeness also assisted in its spread and intensified its acuteness. In conclusion, Ballard urges sanitary authorities to be on the look-out for this disease, and to regard it as an infectious complaint capable of conveyance by the air, sewers, or food. Szontagh¹⁵⁸ B.Z.H. reports a case of croupous pneumonia, with perfect intermittent-fever type, in a 6-year-old boy.

SCARLET FEVER AND MEASLES.

BY LOUIS STARR, M.D.,

AND

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PHILADELPHIA.

SCARLET FEVER.

Etiology.—Kretzschmar¹⁵⁷ reports the following: Mr. M. and family moved to a newly-built house, situated on one of the most elevated points of Brooklyn, and in a portion of the city which is rapidly becoming populated. The house was three stories high, and located on a corner, having bath-rooms, water-closet, etc. December 21, 1888, two years after, the author was sent for, and learned on his arrival that the oldest child, aged 10 years, had died from scarlet fever and had been buried that day. At the same time the writer was informed that Mrs. M. and a child, a girl aged 4 years, were also sick. The examination revealed that the mother was suffering from scarlet fever and the child from diphtheria and scarlet fever. Excessive depression of the heart's action was the most pronounced symptom in both cases. Mrs. M. had been confined only three weeks previous. Two boys and a female infant were in the house with the patients, but at present not infected. Alcoholic stimulants were employed, especially champagne, of which Mrs. M. took 4 pints (2 litres) during twelve hours. The throats were sprayed with a solution of bichloride of mercury (1 to 2000); tincture of the chloride of iron, quinine, and tincture of nux vomica were administered to the mother, and the tincture of the chloride of iron, without addition, but supplemented by the free application of Squibb's oleate of quinine, to the girl. A reliable nurse was procured, and care was taken to open three of the windows, all of which had been scrupulously kept closed to prevent the patients from "taking cold" by their former physician. The following day the condition of the child was much worse: temperature between 103° and 104½° F. (39.5° and 40.2° C.);

pulse small and thready, varying from 140 to 160 per minute. The condition of the mother was unchanged: temperature, 102° to $102\frac{1}{2}^{\circ}$ F (38.9° to 39.2° C.); pulse weak, 128 to 136 per minute; a trace of albumen in the urine. Upon the evening call of December 22d the author found another child, a boy aged 6 years, stricken with diphtheria. During the night, from December 22d to 23d, the girl died. The 23d and 24th did not show any new developments, with exception that dangerous depression of the heart's action, which caused the death of the girl, showed itself in the boy. On the evening of the 24th the mother showed marked signs of improvement, but the boy presented a most distressing picture, lying in his crib with eyes half-closed, neither awake nor asleep; the face having a bluish-gray, yellow hue; the pulse almost imperceptible, about 150 per minute; and unable to speak above a whisper. Walton's oxygen was added to fresh air and administered in liberal doses; a 5-gallon (20 litres) bag being placed upon the patient's bed, its contents were allowed to escape before his mouth in doses of about 2 gallons (7.5 litres) every hour and a half. Champagne was used liberally, and 1-grain (0.064 grammes) doses of calomel were placed upon the tongue hourly and washed down with wine. The following morning, December 24th, all the symptoms had lost some of their severity, except the aphonia. The mother continued to improve. During the night of the 24th the fifth member of the family, the eldest boy, aged 7 years, had been restless and vomited several times, and on the following morning scarlatinal symptoms appeared. The mother continued to improve, and left her bed on December 30th; the eldest boy never showed serious symptoms, and passed through a rather mild attack of scarlet fever; the younger boy, however, remained in a precarious condition for a number of days, and was still unable to speak above a whisper on January 3, 1889. The youngest child, 3 weeks old, escaped both scarlet fever and diphtheria.

The most interesting points connected with these cases are: (1) that five members out of seven of one family were taken ill with either diphtheria or scarlet fever, one of them developing both; (2) that the infant child escaped the infection entirely; (3) that the one infected last, after proper ventilation had been established, developed scarlet fever in a mild form, while the others suffered

from the most severe constitutional symptoms; (4) that there are physicians who object to the entrance of pure and fresh air, for fear that the patient might "take cold," forgetting that by their action they keep the deadly poison within the walls of the patient's room; (5) that alcoholic stimulants, especially champagne, have again proven their great power as heart-sustainers; (6) that oxygen in the 1 case where it was employed carried the boy through the most dangerous period.

To find the source of infection seemed to be of the greatest importance, and an investigation was made, after the author's first call, which revealed the following state of affairs: The house had been built about two years before, and at that time it had been the intention of Mr. M. to connect the building with the large sewer which ran through a street about 250 feet distant.

Upon inquiry at the Department of Public Works, Mr. M. was told that such an undertaking was both expensive and unnecessary, as the city would build a sewer passing his door within a few months. A diligent and economical neighbor was well pleased with the prospect, and, after putting bath-rooms, water-closets, etc., in his new house, he had all the necessary waste-pipes arranged in such a way that they could be easily connected with the sewer that was to be built on the street passing his door. Since that time two years have passed, but the street is still without a sewer, and during all this time the contents of the waste-pipes have been deposited in front of Mr. M.'s house, until lately the entire ground has become saturated with waste products, and the walls of the cellars give the plainest evidence of such a condition, both by means of sight and odor.

The question naturally arises, Who is responsible for a state of affairs which caused so much suffering in one family and the death of two previously strong and healthy children? Is it the Department of Public Works, which gave Mr. M. advice not to build a connection with the sewer, but rather to allow the waste products to accumulate in the ground directly around the premises? Or is it the Department of Health, which, knowing the consequences of such unhygienic and unsanitary mode of building, gave permission to carry out the suggestions of the Department of Public Works? Or is it the head of the house, who suffered his family to live in a place surrounded by deadly infection? Or is it the attending

physician, who failed to do his first duty when he neglected to make use of all possible means to introduce fresh air into the rooms impregnated with the scarlatina and diphtheria poison? The editors answer, all.

C. R. Macdonald,² without presuming to throw any new light on the supposed connection between disease in the cow and scarlet fever in the human subject, reports the following case, which occurred recently in his practice, where no source of the infection of scarlatina could be traced. One of the cows on a farm, however, suffered from ulcers on the teats. The patient, a boy aged 14 years, lived with his parents on this farm. The farm-house was situated on a hill, quite isolated from any other dwelling, and built on one of the knolls of gravelly sand which surmount an extensive stratum of boulder-clay. The boy had been attending school until Monday, October 14th, when he complained of being ill. The author was called to see him on the morning of the 16th, when he was found to be covered with the characteristic scarlatinal rash, the throat, temperature, etc., confirming the diagnosis of a typical case. As the writer knew of no other case of scarlatina in the district, and could find no history of exposure on the part of the boy to any infection, he naturally asked if there was any case of illness among the cows. The boy's mother told him that the cow which supplied them with milk had very sore teats for almost two weeks; that the cow seemed ill and feverish for some days, and that a calf fed (not suckled) with the cow's milk had been purging for a few days, and not taking his milk as usual.

Macdonald examined the cow and calf. The cow had given birth to a dead calf some months ago, and the calf fed with her milk was 6 weeks old. The cow's teats were more or less covered with ulcers of an oval-shape, varying in size from 5 to 15 millimetres ($\frac{1}{5}$ to $\frac{2}{5}$ inch) in length and almost as wide, the edges being well defined. There were from two to four ulcers on each teat, and also one covered with a scale and almost healed on the udder between the two right teats. The calf appeared to be in a healthy condition. The boy was isolated as far as circumstances would permit, the drinking of the cow's milk discontinued, and there is yet no appearance of the infection spreading to two other members of the family, one older and the other younger than the patient, who never had scarlatina. The question, then, that sug-

gests itself is: Can there be any relation between the bovine and the human disease in this case? There is no history of a previous case of scarlet fever, no clue to the exposure of the boy to any infection; the milk-supply was from the cow with the sore teats, none of the milk from this cow being sold. The water-supply and drainage were perfect. It is possible that some of the children from other parishes, who were attending school with the boy, may have carried the specific poison to school; but the fact that only the boy in question caught the disease in a school with over 170 pupils renders such a supposition highly improbable. It appears, therefore, that the only etiological factor remaining is the disease of the cow.

Marie Raskin, of St. Petersburg,^{50, B.5, Nos. 13, 14; May 11, 61}, from a series of clinical and experimental investigations, draws the following conclusions: 1. The malignant complications occurring in scarlet fever—lymphadenitis purulenta, phlegmon, otitis purulenta, synovitis purulenta, broncho-pneumonia, pleuritis, pyæmia, and septicaemia, perhaps also diphtheria and serous synovitis—are caused by secondary streptococci infection, other micro-organisms possibly having a share in the origin of some of the above processes, as pyogenous staphylococci in otitis and micrococcus pyogenes tenuis in pyæmia. 2. The introduction of the streptococci occurs through the primarily inflamed throat, whence they extend through the lymph-channels and thus get into the blood. 3. The streptococci having invaded the blood, there are three possibilities: (a) the cocci may disappear from the blood without any consequences except more or less fever; (b) they may increase rapidly in the organs and cause death by general septic infection; (c) oftener they may cause death by pyæmia. 4. The chain coccus occurring in scarlet fever may be regarded as a variety of the well-known streptococcus pyogenes. 5. It is not the cause of scarlet fever.

Symptomatology.—Kailas Chunder Bose²⁰⁶ reported the following case of scarlet fever before the Calcutta Medical Society. This case is of interest, as it plainly shows the slight variation in the temperature during the day:—

A child, aged 6 years, complained of sore throat and fever; the next day the author noticed the characteristic scarlatinal rash on his body. The muscles of the neck were stiff; temperature, 103° F. (39.5° C.); pulse, 128; respiration, 26. The child was at

once placed in a separate bed, where other children were not allowed to go. Two nurses were engaged to attend the sick child, and every precaution was taken to minimize the danger of contagion among the other members of the family. The writer instructed his nephew, a young man, to keep a record of temperature during the whole period of illness, and from which the following chart is taken:—

Day.	9 A.M.	12 Noon.	5 P.M.	8 P.M.	12 Midnight.
2d	103	103.8	104	104.5	104.8
3d	103	104	104	104.2	102
4th	102.6	103	104	104.2	102
5th	102	102.5	113	103.6	102
6th	101	101	101.5	101.6	100
7th	101	101.5	101	101	101.2
8th	100	100	101	101	101
9th	99	99	99	100	98.6
10th	98.6	98.6	98.6	99	99
11th	101	100.8	101	101	101
12th	101	101	101	101	101
13th	99	99	99	99	99
14th	97	98	98		
15th	Normal.				

The child's distressing symptoms did not disappear until the morning of the sixth day, when he was able to sit up in bed and swallow his food and nourishment better than before; the stiffness of the neck persisted for several days. On the morning of the eleventh day an enlarged gland was noticed on the right side of the neck, which at first threatened to suppurate, but fortunately yielded to treatment. Desquamation commenced on the fifth day and was not completed before the sixteenth.

Kailas Chunder Bose²⁴⁶ reported the following case: A girl, aged 12 years, in full term of pregnancy, came to the author's house, where there had been several cases of scarlet fever, to be confined. She was kept in a separate apartment where none of the convalescents were allowed to go. She was safely delivered of a female child, and everything went smoothly until the sixth day, when she complained of sore throat and fever. She was then placed under the care of K. McLeod, Health Officer of Calcutta. He saw her the following morning. On examining her throat it was found that her tonsils were enlarged and very much congested; temperature, 105° F. (40.5° C.); no pneumonia. Her uterus was fairly contracted, with no pain on pressure over the abdomen.

Secretion of milk fairly established; lochia perfectly free from unpleasant odor. A scarlatinal rash came out on the second day of the fever, accompanied by restlessness, insomnia, and prostration; pulse, 160° , soft and compressible; tongue dry and furred, red and clean at the tip and edges; submaxillary glands enlarged and painful on pressure; intense headache; delirium and distressing throat symptoms. Nourishment and stimulants were freely given. The puerperal element in this case, if any, was so trivial as to escape notice altogether. In spite of the careful treatment and nursing the girl died. The child was removed to another room during the first day of its mother's illness, and kept under the charge of a wet-nurse. It thrived well for one month, when the fever and characteristic rash appeared, owing to the carelessness of the maid-servant, who wrapped the little child with a piece of shawl which was used by its mother on the first day of her illness. The child died during the third day of the disease.

At the Third General Meeting of Russian Medical Men, K. K. Reimer, house-physician to the Nikolaevsky Hospital for Children, St. Petersburg, ¹⁰⁰⁸ _{nos. 27; June} ²⁵ read a valuable paper on scarlatina, based on 3640 cases with which he had met during the period of 1868 to 1888, both in his hospital and private practice. The first division of his monograph is dedicated to the study of fever. He classifies the cases as follows:—

(A) Simple or uncomplicated scarlatina. (a) Mild form (61 cases = 1.1 per cent. of the total number). During a few first days of the rash the temperature oscillates at a febrile height, but hardly ever reaches 39° C. (102.2° F.), while subsequently it becomes normal ("subfebrile"). In general, the course of the temperature resembles that in rötheln, the only difference being its tendency to slight re-elevations. The course of the affection itself is mild; sore throat trifling. The mortality = 0.

(b) Severe form (211 cases = 5.7 per cent.). In twenty-four the temperature rises to 41° C. (105.8° F.), to keep at that level for three or four days. The mortality amounts to 83.7 per cent., death ensuing either at the high temperature or after a rapid fall below the standard.

(B) Complicated scarlatina. (a) Mild form of a moderate duration (317 cases = 9.1 per cent.). For from two to four days the temperature oscillates about 40° C. (104° F.), and then tends

to sink. The fall, however, is soon interrupted by slight and evanescent rises, caused by mild complications, such as follicular angina, mild diphtheria, etc. The characteristic differential feature of the variety is constituted by the frequent occurrence of a critical fall of the temperature. The mortality = 2 per cent.

(b) Graver form of moderate duration (468 cases = 13.5 per cent.). The temperature continues to oscillate about 39° C. (102.2° F.) up to the fourteenth or even seventeenth day. The mortality = 7 per cent.

(c) Mild form of a rather protracted character (339 cases = 9.7 per cent.). Once the *fastigium* over, the temperature but seldom rises above 39° C. (102.2° F.), and, about the twenty-first day of the disease, returns to the normal level, the complication being of a non-malignant nature. The mortality = 5.6 per cent.

(d) Severe form of a rather protracted character (682 cases = 18.7 per cent.). The temperature continues to keep at a moderate febrile height up to the twenty-fourth or even twenty-eighth day, which is dependent upon some grave complications, such as pericarditis, endocarditis, nephritis, etc. The mortality = 39.3 per cent.

(e) Mild form of a prolonged duration (419 cases = 12.1 per cent.). A continuous fever is present, with obstinately recurring re-elevations, caused by more or less mild complications. In favorable cases recovery ensues between the thirty-fourth and fortieth day. The mortality = 26.5 per cent.

(f) Severe form of a prolonged duration (371 cases = 10.7 per cent.). From the beginning to the end the temperature keeps at about 40° C. (104° F.), with short remissions depending upon grave complications, such as erysipelas, pyæmia, gangrenous diphtheria, etc. The mortality = 80.0 per cent.

The next part of the author's work deals with oscillations in the child's weight, observed under various conditions. In all, 18,976 weighings were made in 968 cases.

(A) Expectant treatment (344 cases, referring to 196 boys and 148 girls). 1. In the course of fever, girls lose in their weight, in average, one twenty-fourth less than boys. 2. In mild cases the loss is trifling. 3. But in severe ones, during a few first days of the efflorescence, the loss may amount to from 600 to 1000 grammes (1 pound 5 ounces to 2 pounds 3 ounces) and even more,

which is caused by vomiting, diarrhoea, and defective systemic nutrition. A total loss may reach, in from seven to ten days of fever, from 2000 to 2500 grammes (2 pounds 10 ounces to 3 pounds), or even more. 4. In protracted cases, associated with a more or less obstinate fever, the loss proceeds much more slowly, but at the same time more steadily, so that the child may lose in a month or so as much as one-seventh of its original weight. 5. The loss, however, is not of a strictly progressive character, but may be interrupted by some increase or decrease, according to the course of fever and systemic nutrition.

(B) Antipyretic treatment (624 cases). 1. In cases with a constant high fever antipyretic drugs prove to be powerless to check loss of weight. 2. Hydro-therapeutic means, however, seem to show some controlling influence on the loss. The remaining, and by far the most important, portion of the paper embodies the results of a comparative study of various antipyretic methods.

I. Hydro-therapeutics (978 cases of a grave or hyperpyretic character). 1. Cold compresses to the head, neck, chest, and abdomen, as well as cold ablutions of the whole body, have solely a sedative action on the nervous system, but do not exercise any influence on the course of fever. 2. Cold packs (28 cases with intense nervous excitement) fail to depress a high temperature, and even are sometimes followed by a still further febrile rise, and not infrequently by cyanosis and failure of the pulse. Prolonged (several hours) packings "not infrequently give rise to lethal collapse." 3. Cold packs with cold irrigations (131 cases) give satisfactory results in regard to the pulse, cyanosis, and respiration only, but show but a very trifling influence on the fever. 4. Cold packs with cold irrigations in a gradually-cooled bath (96 cases) act in the same way, but more rapidly. Fairly frequently, however, they cause collapse. 5. Tepid baths (72 cases) are useless, and, when lasting more than half an hour, even decidedly harmful, since they cause weakness of the pulse and cyanosis. Those unwelcome symptoms may be neutralized by cold irrigations. 6. Baths of 28° R. (95° F.), gradually cooled down to 22° or 20° R. (81.5° or 75.2° F.) (186 cases) cause collapse and sudden death by far more frequently than other hydro-therapeutic means. 7. Cold baths at 18° or 16° R. (72.5° or 68° F.), or even 14° to 20° R.

(63.5° to 75.2° F.), of from five to eight minutes' duration, accompanied with energetic frictions of the whole body (363 cases), give relatively most satisfactory results: they secure a decrease of the temperature amounting to 2° C. (3.6° F.), as well as a considerable improvement of the pulse and respiration. 8. On the whole, the selection of this or that method is determined by the patient's age and the individual peculiarities of his case. Cold baths alone exercise a powerful and beneficial action on the nervous system, and especially on the circulatory nerve-centres.

II. Antipyretic drugs. 1. Quinine (148 cases), administered internally, or under the skin, or in enemata, has no influence on the temperature during the period of efflorescence, but acts somewhat better in that of defervescence. 2. Salicylate of sodium (431 cases) proves to be utterly inactive in regard to the temperature, but exercises a decidedly injurious action on the heart—increases cyanosis, etc. 3. Kairin (36 cases) acts on the heart still more harmfully, and, in addition, retards the respiration, while manifesting scarcely any influence on fever. 4. Thallin (48 cases) is utterly unreliable and inconstant in its action on the temperature: in some cases it does not lower it at all, while in others it causes a subnormal fall, accompanied by grave collapse. 5. Antipyrin (684 cases) has no influence whatever on the course of the disease itself, and fails to depress the temperature during the stage of efflorescence. Still, "it proves to be distinctly beneficial in protracted cases, in virtue of its successfully counteracting the injurious process of tissue combustion." Besides, "it seems to enable children to better cope with severe complications of scarlet fever." Taking all in all, antipyrin deserves preference over all "other antipyretic drugs, its main advantage being a comparative freedom from unpleasant accessory effects." Perspiration and sickness are said to be observed only when the drug is employed in unduly large doses. 6. Antifebrin (522 cases) is, on the whole, similar to antipyrin; but its use requires a still greater caution, since it is apt to induce various untoward phenomena. Especially in patients suffering from cardiac disease the drug is exceedingly prone to give rise to cyanosis and collapse. In the course of a discussion, I. M. Neustab, of Ekaterinoslav, stated that he obtained very good results in scarlatina from baths, at 20° or 22° R. (75.2° or 81.5° F.), of from fifteen to twenty minutes' duration. The

disease ran a distinctly better course, and renal complications were observed far less frequently than under all other methods.

Prevention.—L. Mervin Maus⁵⁹ gives the following brief rules as preventive measures to the spread of scarlet fever. This practice is founded on personal experience, and has so far been entirely satisfactory. The author also believes that this treatment would be successful in the other exanthemata as a preventive measure: 1. Sponge the patient thoroughly, morning and evening, with a tepid solution of corrosive sublimate, 4 to 1000, as soon as the eruption makes its appearance. 2. Wash the hair once daily with a solution of corrosive sublimate of the same strength and also a solution of borax, 1 to 250. 3. Disinfect the urine, faeces, and expectorations, also the discharge from the ears and nose, if there be any, with a solution of the bichloride, 1 to 1000. 4. As soon as the patient is permitted to leave the bed, have the body washed with warm water and a bland soap; then sponge with bichloride solution, 1 to 4000, wipe dry, and anoint with the following ointment:—

R. Sodii boratis,
 Zinci oxidi, aā 3iv (15.5 grammes).
 Ol. gaultheriae, : : : : . 3ss (2.0 grammes).
 Vaselini, 3iv (118.2 grammes).—M.

The hair should be thoroughly washed with the bichloride and borax solution. 5. The patient is then to be enveloped in fresh and perfectly clean clothes throughout, and allowed to leave the sick-room if his condition permits. 6. The bed-linen, soiled clothes, towels, etc., should be placed in a suitable sublimate solution and boiled, and the room well disinfected with sulphur. The sulphur-candles are very convenient, and the disinfection should be repeated the second day, as the germs are very difficult to destroy. 7. Require the nurse or attendant to keep the hair, face, and hands well disinfected during attendance, and to likewise make a complete change in his or her garments on date of the disinfection of the sick-room. 8. Continue the provisions of the third and fourth rules once daily until desquamation is complete.

Complications.—H. E. Knipp¹²¹ reports the following interesting case of haemorrhagic scarlatina: Ida S., aged 21, had a chill Friday evening, November 23, 1888, followed by slight fever. Saturday she was much better until evening, when she had another

chill, accompanied by high fever, profuse uterine haemorrhages, and sore throat. Early Sunday morning she was attacked with vomiting; later in the day she suffered with intense pain in the lower part of the abdomen, and the blood came from her uterus in clots. In the evening bleeding from the mouth and nose set in, quickly followed by diarrhoea. Patient complained of feeling hot, severe headache, and ringing noise in the ears. She remained in this condition until Monday night, when the writer was summoned, and found her in the following condition: Her mouth and nose contained blood; there were evidences of uterine haemorrhage and purpura haemorrhagica on the face, neck, chest, and extremities. Patient was in a semi-unconscious state, and could only be roused by loud calling; when asked whether or not she had pain, she, after great effort, indicated that her head hurt her. Pulse appeared tolerably strong; temperature, 103° F. (39.5° C.). Half a drachm (2 cubic centimetres) each of aromatic sulphuric acid and fluid extract of ergot were ordered every three hours.

Tuesday morning all the subjective symptoms were aggravated; swallowing was performed with great difficulty, owing to the large amount of blood in the mouth, and the tongue was swollen and stiff. As the haemorrhage did not cease, a hypodermic of fluid-extract of ergot and whisky, 30 minims (2 cubic centimetres) of each, was administered. When the hypodermic needle was introduced into the thigh, a characteristic scarlatinal eruption was observed, in addition to the purpura haemorrhagica, which covered the legs and thighs. This eruption was not present the preceding night. Radial pulse imperceptible; temperature, 103° F. (39.5° C.). 3 P.M. The haemorrhage had slightly decreased; the eruption extended over the abdomen, but was fading on the legs. Patient was unconscious, but exhibited signs of pain when hypodermics of ergot and whisky were given. Pulse imperceptible; temperature, 105° F. (40.5° C.). 7.30 P.M. The eruption extended over the chest and neck, and was appearing on the face; had disappeared entirely from the legs, and was fading on the thighs. Pulse imperceptible; temperature, 106° F. (41.1° C.). Heart stopped beating a few minutes after the thermometer had been removed from the axilla. The history of the case until Monday, midnight, was given by the mother. In the intervals between visits whisky was administered every ten or fifteen minutes. The patient was a thin, anaemic

woman, a cigarette-maker by occupation, and had been feeling unwell for several months previous to this illness, though not sick enough to go to bed. From her sixteenth year she had suffered great pain and lost a large amount of blood at her menstrual periods.

After the diagnosis was made, on Tuesday morning, hygienic measures were adopted and chloride of lime was freely used all over the house. Several members of the family suffered with sore throats, but none of them have had eruptions on the body up to the present time.

Sequelæ.—C. H. L. Johnston²⁸⁴ _{Sept.} reports the following unusual sequelæ in scarlet fever: Girl, aged 5 years, whose previous health had been good, showed symptoms of the disease, the eruption appearing on the 31st of January, 1889. She passed through a severe attack of the fever; desquamation was taking place, and everything seemed favorable. On the morning of the 18th of February, at the child's request, her mother gave her a drink and laid down beside her. In about ten minutes a gurgling noise was heard, and the mother discovered blood pouring from her mouth and nose. The child expired almost immediately.

The cause of death was, no doubt, rupture of one of the branches of the carotid artery, the vessel probably having undergone softening and sloughing, as a result of disease. Charles West¹⁰⁸³ states that he has only seen one instance in his large experience, although it came thrice under the observation of Kennedy, of Dublin.

Treatment.—Brendon Curgenven² _{Oct. 2} has been using the oil of eucalyptus in the treatment of scarlet fever, with complete success. Of 4 cases, each was in a family where there were other children who had not had the disease. The fever in these cases declined in a few days, and at the end of a week or ten days they joined the rest of the family without communicating the disease to any of them. There was no general desquamation; it occurred only on those parts where the rash was the thickest.

To destroy the septic poison of scarlet fever the course is to saturate the patient with the antiseptic as quickly as possible. The author administers the oil internally in from 1- to 4- drop doses every four hours in an emulsion, as then it is more equally diffused through the menstruum, and is better borne by the stomach.

The attendant is directed to use, with a spray-diffuser, Tucker's eucalyptus disinfectant over and around the bed at frequent intervals, sprinkling the same on the floor of the room or evaporating it on a hot fire-shovel. This disinfectant contains, besides the oil of eucalyptus, some other strong but innocuous antiseptics. The patient also should be rubbed all over the body with the same fluid, not allowing any portion of the skin to escape. This is to be done night and morning for the first few days, then each night until the end of ten days. The head and hair are also subjected to the same treatment every three days. At the end of a week a bath, with the use of the eucalyptus soap, is used every night, the eucalyptus fluid being rubbed over the skin afterward. He found that the free use of this antiseptic was not attended by any ill effects whatever, either to the patients or those in attendance, and he firmly believes that it has the power of destroying other septic poisons than that of scarlet fever.

S. Henry Dessau¹³⁹ _{Feb} gives the following valuable treatment for the complications of scarlet fever:—

Nephritis. This affection sometimes occurs so early in scarlatina that it might be regarded as a part of the general disease. It is when it occurs after the eruption has subsided that it may more properly be said to be a complication. The writer makes it a part of his routine management of scarlatina to *examine the urine*, at intervals of every other day, from the time that the eruption disappears until the end of the sixth week from the inception of the disease. Whenever albumen is found he administers the tincture of cantharides in doses of $\frac{1}{8}$ drop (0.006 gramme), repeated every three hours, and the albumen frequently disappears in from two to three days. Since following this method Dessau has not met with a case of dropsy nor uræmic convulsions occurring in cases that have been under his care from the start. In cases of scarlatinal nephritis already developed, he uses the time-honored treatment of spirits of nitrous ether, infusion of digitalis, and compound spirits of juniper together, in combination with the bitartrate of potash. He has used the fluid extract of jaborandi in doses of $3\frac{1}{2}$ to 7 drops, repeated every three hours, with gratifying results. In mild cases a hot bath is given night and morning, and the patient put to bed between blankets immediately after. In severe cases the hot-air bath has been resorted to with success in inducing perspiration. In every

instance the patients are encouraged to drink plenty of cold water, without ice.

Convulsions. When convulsions occur during the complication of nephritis, the hot-air bath, dry cupping over the kidneys, together with the rectal administration of chloral hydrate and bromide of potassium, are employed.

Rheumatism. Pain in the joints is a not infrequent complication of scarlet fever. The author reports a case of a girl, aged 6, that came under his care. There was, during the complication of a rheumatic affection of the joints, a contraction of the muscles of the same nature as myalgia. Certain groups of muscles were disposed to be involved, those of the neck producing the condition of opisthotonus. In treating the complication of rheumatism the writer employs the bromide of ammonium in doses of 3 to 5 grains (0.2 to 0.32 gramme), repeating every two or three hours.

Ear Complications. Where there are signs that the middle ear has become involved, from the extension of the inflammatory process from the fauces through the Eustachian tube, an early puncture of the drum-membrane is performed and insufflations of boric acid used daily. In addition to the general treatment, the author gives the calcium sulphide in doses of $\frac{1}{16}$ grain (0.006 gramme), to prevent extensive suppuration or to check it after it has once begun.

C. R. Illingworth, Accrington, Eng., ²_{v.2, p. 176} has great faith in the local application of a 1 to 500 solution of the biniodide of mercury in the iodide of sodium. Thus, to 8 ounces (236.5 cubic centimetres) of the liq. hydrarg. bichlor., of double strength (viz., 1 to 500), add $\frac{1}{2}$ drachm (1.9 grammes), by weight, of the sodic iodide; this should precipitate and redissolve the biniodide, giving a clear solution. Sweetened with a little pure glycerin, it is not much objected to by children. The affected parts of the throat should be brushed with this solution by means of a stout, straight, laryngeal brush every four hours. Internally the biniodide mixture every two hours. If purging should supervene, the perchloride of iron and chlorate of potash, with the biniodide in powder, $\frac{1}{16}$ grain (0.004 gramme) should be given three times a day. The author has noticed that in cases with purging the local affection in the throat has been pharyngeal as much as if not more than tonsillar. The writer feels convinced that, by assiduous

attention on the part of both physician and nurse to the throat affection, the local action of the biniodide is sufficient to prevent the spread of infection from one child to another, even if kept in the same room continuously. By following out this treatment, Illingworth claims that cases can be cured in five, six, or seven days, deflorescence beginning on the first day of treatment and the skin becoming clear of rash on the fifth day. Further, the disease is followed by no dreadful sequelæ. There are no cervical abscesses, no otitis nor chronic otorrhœa, and, above all, there is no albuminuria from scarlatinal kidneys.

Purdy,² has employed the mercuric iodide in some 50 cases of scarlet fever, during several epidemics, with the most gratifying results. In spite of the disease in one epidemic being of very severe character, there was only one fatal case, and that was dying when first seen. After administering the drug the temperature falls rapidly and the patient seems well in about three days, desquamation being very slight. The average period during which his cases were isolated was only eighteen days. He had seen no cases of infection from convalescents, and there were no lingering sequelæ. In one case a child was ill for five days, the diagnosis being uncertain; then the mother and several children were attacked with evident scarlet fever, two being very ill, with sloughs in the neck, but all made a good recovery, and were perfectly well before the first child had ceased peeling. The following is the formula used by the author:—

R Liq. hydrarg. perchlor., 5ij (31 grammes).
 Potassii iodid., 5ss (2 grammes).
 Syrupi, q. s. ad f5vij (236 grammes).

M. Sig: One tablespoonful every one, two, or three hours, according to circumstances.

N. S. Wood¹²⁹ has been using the following gargle with success for a child of 10 years:—

R Listerini, 5ij (8 grammes).
 Ext. pinus Canadensis, 5ss (2 grammes).
 Potassii chlorat., 5ss (2 grammes).
 Glycerini, 45v (18 grammes).
 Aquæ, f5j (31 grammes).

M. Sig: Use as gargle every two or three hours. In smaller children, unable to gargle, a teaspoonful may be given every three hours.

MEASLES.

Etiology.—Sevestre, ⁷⁵_{Mar. 2; Mar. 6} at a meeting of the Société des Hôpitaux, says that in order to prevent the spread of measles its mode of propagation should be understood. Rubeola is very contagious during the period of invasion, continues to be so, but at a less degree, during the eruptive period, and ceases at its termination. Transmission is usually effected by the circumambient air. Contagion by a visitor or by objects which the patient touches is rare. The contrary takes place in diphtheria, for contaminated objects conserve their contagious powers for years. Consequently the prophylaxis of the two affections differs. In the case of measles, the patients should be isolated without delay; but in diphtheria, besides isolation, every object in contact with the patient should be thoroughly disinfected.

Symptomatology.—H. Leroux ¹⁵²_{Mar. 22} refers to cases of measles in which it was evident that the stated period of incubation (twelve to fourteen days) had been exceeded. In one case, a boy aged 7 years, who was sent to the country the day following the appearance of the rash on his sister, developed the rash himself twenty days later. The second, a school-girl, whilst suffering from an attack of scarlatina was also incubating measles. The scarlatina developed March 29th, the fever declined April 10th; but on the 14th she again complained of sore throat, had coryza, etc., and on the 15th showed the rash of measles. She had been separated from her school-fellows for nineteen days, and either the measles had an incubation period of at least this duration or it must have been conveyed to her whilst suffering from scarlatina.

The third case was a boy of 8 years, who had been isolated from a younger sister suffering from measles, and who did not exhibit the rash himself until twenty days afterward. Of course, in each case the contagion might have been conveyed by a third person, but the writer is perfectly satisfied that this did not take place. The second case is remarkable as an instance of concurrence of two specific infective disorders.

Townsend, ⁵⁹_{Aug. 22} before the Obstetrical Society of Boston, described an epidemic of 76 cases of measles, many of which were mild, some exactly resembling the description given of rötheln, while others were typical cases of measles. He concluded that this was an epidemic of measles, as of some 73 other children

exposed who did not contract the disease 66 had had measles before, most of these in an epidemic of the year preceding. This later epidemic, although generally of a severe type, contained 1 case, at least, which closely resembled the description given of rötheln. At the same time that the mild epidemic was at its height a small epidemic occurred at the McLean Asylum, all of these cases being in adults, and all resembling the description given of rötheln. The following conclusions were drawn: 1. That mild epidemics of measles occur in which many of the cases exactly resemble cases described as rötheln. 2. That in the severe epidemic of measles similar cases resembling rötheln are occasionally found. 3. That enlarged cervical glands and sore throat are sometimes found in measles, and are not always present in cases described as rötheln. 4. That there is no distinct symptomatology for rötheln. 5. That the strongest evidence in favor of the individuality of rötheln is the fact that previous attacks of measles or scarlet fever afford no protection from this disease. 6. That, as second attacks of measles do occasionally occur, it is impossible to make the diagnosis of rötheln, unless, as in the epidemics mentioned before, we meet with a series of cases many or all of which have previously had measles. 7. That, as it is impossible to say how many second attacks of measles may occur in a given epidemic, this evidence of the individuality of rötheln is made somewhat problematical, and gives rise to the question, which the author was unable to answer, Is it possible that in some epidemics and not in others measles attacks equally those who have had measles before and those who have not, and afterward affords no protection from measles? In other words, Is rötheln a mild form of measles?

Incubation.—P. Trekaki ²¹⁷_{v.14, No. 49; May} ²³¹ records a case of measles in which the period of incubation was twenty-seven days. The patient was a little girl of 1 year and 8 months. The following facts were gathered concerning the origin of the affection: Twenty-seven days previously a man whose little daughter was recovering from measles came to the house of the patient's parents to wax the floors, and remained there for half an hour. The presence of this man was the sole cause of infection, for the little patient had never been taken where cases of measles had occurred.

On Thursday, May 3, 1888, J. J. Eyre ²_{v.14, No. 23} was requested to see one of the masters at the boys' school at Claremont, Becken-

ham. On inquiry he learned that he returned to the school on the previous Monday evening, April 30th, about 10 P.M., having been away for some weeks during the Easter holidays. On Monday and Tuesday he felt badly and on Wednesday quite ill. He imagined he was suffering from a severe cold. When the writer saw him, on Thursday, May 3d, he had the rash of measles out on his face and chest, and evidently was in the fourth day of the disease. During Tuesday and part of Wednesday he came into contact with 29 boys, whose ages varied from 7 to 14 years. After Wednesday evening, May 2d, he was completely shut off from all communication with the boys. The school was closed on Friday, May 4th, when all the boys (most of whom were boarders) were sent to their homes in different parts of the country. Out of the 29 boys 15 had had measles at some previous time; the remaining 14, who had not had measles up to then, were all taken ill with the disease within seventeen days. The first boy was taken ill on Thursday, May 10th, and the last boy a week later (May 17th). The incubation period in the majority was about fourteen days. This outbreak the author thinks a very important one, from the short time the boys were exposed to the contagion, it being certainly known to be not more than thirty-six hours. It therefore shows the exact time of incubation within narrow limits, and shows that the incubation period varies from eight to nine days to fifteen and sixteen days in different cases. It also proves that measles is extremely contagious before the rash appears, as not one of the boys saw the master after the rash came out on him, it having made its appearance on Wednesday night. The tables given below indicate the important points in the outbreak at a glance:—

Time Master was in Contact with Boys.	First Boy Taken Ill.	Last Boy Taken Ill.
May 1, 2.	May 9, 10.	May 16, 17.

Total Number in Contact with Master.	Total Number who had the Disease Previously.	Total Number who Took the Disease from Master.
29	15	14

Infectious (?) Broncho-Pneumonia in Measles.—Bard²¹¹_{Jan. 18} reports a severe epidemic of measles in a small village in the south of France, and traces, in the official report of the medical officer, some evidence that all, or nearly all, the fatal cases arose by infection from a single case, in which there was not only measles but also broncho-pneumonia. He is inclined to separate the infections of measles and broncho-pneumonia, and merely to admit that the state of measles renders a child much more liable to a separate infection of broncho-pneumonia. At any rate, he is anxious to act on this hypothesis in isolation, and to keep apart two classes of cases of measles, viz., those who have and those who have not what is generally termed the subsequent bronchitis. He refers to some very high death-rates in measles, such as 42 per cent. during the years of 1867–1872, and even 60 per cent. in 1871, in the Hôpital des Enfants Assistés, at Paris, where all cases are put together. How far such startling figures may be due to want of ventilation and nutrition he has no means of determining; and he advises not only ventilation, but also separation of the bronchopneumonic cases so long as they are suffering in this way.

Thomas F. Raven²_{May 25} says that among 450 children in an institution a case of measles, imported, appeared during the summer of 1888. The child was immediately isolated, and two days later sent to a hospital. Twelve days later a second case occurred, which was at once sent away. Three days later a third case was found, in which, therefore, the incubation must be estimated at either fifteen or three days. Three days later the fourth case occurred, and in this instance choice must be made between eighteen or six days for incubation. For eight days after this no other case of measles appeared. Here fourteen or eleven days must be held to be the time of incubation. The last case happened one day later, when the orthodox twelve days could again be assumed as the breeding-time of the disease. After the first case every child was sent directly to a hospital when the symptoms appeared, and by this means the epidemic was checked.

Loeb,³¹⁹_{Apr. 13; May 13}⁶ of Frankfort, writes that he has found *propeptone* or *hemialbumose* in the urine of 9 patients with measles out of 12 cases of the kind in which he examined the urine for it. The method of testing employed by him is as follows: Sulphuric acid added to the urine, drop by drop, causes, if propeptone is present,

a copious, white, flocculent precipitate, which disappears on heating, but reforms if the liquid is allowed to cool. Acetic and hydrochloric acids will give a similar reaction. It must be remembered that an excess of acid will redissolve the precipitate; therefore it is necessary to be careful to add it slowly. As a rule, in the cases of measles examined, the reaction was obtained for about two days at the beginning of the affection, after the temperature had begun to go down, but before the rash had disappeared. The writer found in several of his cases some enlargement of the liver, which he thinks may have some connection with the change in the urine. He also suggests that perhaps the skin affection is connected with the formation of propeptone, as it has been found in patients suffering from various affections in which the skin is implicated; thus, Leube found it in urticaria, Ter-Grigorianz in diffuse dermatitis, and Lassar was able to produce it in animals by rubbing petroleum ointment into the skin. Regarding the relation of propeptonuria to the condition which gives the so-called dinitro-benzolic-acid reaction which is frequently found in typhoid, scarlatina, advanced phthisis, and other febrile diseases, Loeb has found that its presence does not always imply the existence of propeptonuria, though in many cases the former condition co-exists with it.

F. W. Joshua,⁶ _{July 13} reports the following case: On March 23d the author was called to a private school for boys; an epidemic of chicken-pox of a mild type had broken out,—indeed, so mild that some of the cases had escaped notice. On the evening of March 25th he was requested to see a boy, 11 years of age, who had one well-marked vesicle on the face and another on the back; temperature, 104° F. (40° C.); face flushed; tonsils red and enlarged; tongue furred; velum palati reddened, but no other catarrhal symptoms. When the writer saw him, the following morning, his face and chest were covered with small, rounded, erythematous patches, which afterward spread to the rest of the body, and the usual catarrhal symptoms of an ordinary but severe attack of measles were present; the temperature was two degrees less than the night before. The measles followed the usual course, and on the fourth day, the rash still being well out, the face and chest became scattered over with vesicles of chicken-pox, a few appearing on the limbs also. The eruption of the measles disappeared on the sixth day, but the chicken-pox vesicles did not

desiccate until ten days later. This was the only case of measles in the school at the time, but there was an epidemic of it in the neighborhood. When the boys recovered from the chicken-pox they went home apparently in good health, but most of them were subsequently attacked with measles.

DIPHTHERIA PERTUSSIS AND PAROTITIS.

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DIPHTHERIA.

Pathology and Etiology.—By far the most important contribution to the study of the etiology of diphtheria during the past year has been made by Prudden.⁵ It is the result of observations in 24 cases, in nearly all instances early autopsies being obtained. The difficulty, he says, is great, because we are liable to have, on the parts which are most often the seat of the local lesion of diphtheria, the greatest variety of living bacteria from air, water, and food. The only species of bacteria present, in all cases but 2, was what he calls *streptococcus diphtheriae*, which was found most abundantly in the pseudo-membrane and in the underlying necrotic tissue. The second most common form was the *staphylococcus pyogenes aureus* or *albus*, which bore no relation, in amount or situation, to the extent of the pseudo-membrane; in fact, it seemed to have a closer relationship to the amount of catarrhal than pseudo-membranous inflammation. About twenty other different species of bacteria were isolated in the course of this investigation, which were found to occur in the mouths and air-passages of healthy children. In no case was the bacillus of Loeffler found.

The *streptococcus diphtheriae* consists of sphaero-bacteriæ or cocci, averaging 1 micromillimetre in diameter, and are apt to form chains as they grow. Experiments were made upon 80 animals with cultures from 10 of the diphtheritic cases, with the following results: 1. In no case was a typical diphtheria produced. 2. In 2 animals no effect was produced. 3. In almost all more or less redness and swelling occurred around the seat of the inoculation on the second day; in 4 cases a non-spreading, yellowish-

white pellicle formed, consisting of necrotic mucous membrane, containing micrococci similar to those injected; in 3 cases a membrane, consisting largely of mucus, non-spreading, and of dense, stringy quality, white in color, adhering moderately, finally appeared. Half of the animals died between the second and the sixth day from feebleness. Control experiments were made with the scrapings of the throats of 25 healthy children; in no case was the streptococcus found. In 6 children sick with various diseases it was found in only 2, both of whom developed diphtheria within a week.

Prudden believes in the insusceptibility of animals to diphtheria as we know it in man, although in calves, fowls, pigeons, and rabbits a disease may occur associated with a false membrane on the mucous surfaces, but none appear to contain the same bacteria as in the human disease, and, moreover, they differ in different animals. The streptococcus, when dried on smooth surfaces or fabrics, retains its virulence and vitality for long periods. When subjected to a temperature below freezing—14° F. (10° C.) for seventeen hours—the vitality of a considerable portion of the germs was impaired. In regard to the action of germicides on the streptococcus, Prudden believes that the bichloride of mercury heads the list in point of value; creolin next, and then carbolic acid; finally, the vapor of burning sulphur. In all cases, however, "they are much less efficient when applied to the bacteria which lie imbedded in the pseudo-membrane and the tissues than when they are free in the pure culture."

Roux and Yersin,²⁶² in a series of experiments, confirm Loeffler's results. They found the bacillus in 15 cases of diphtheria. With pure cultures they were able to produce false membranes in animals, and the disease was followed by paralyses analogous to those observed in man.

Rachford,⁹ concludes that diphtheria is a local disease, and he states that no subcutaneous inoculation experiments have ever resulted in its communication; but, on the other hand, if the broken surface of a mucous membrane or wound of the skin become inoculated, the disease often results. He therefore thinks that the diphtheritic germ is an external and not an internal parasite, and that the disease has no latent stages, second and third attacks being due to re-infection. Robinson,⁶¹ at the Association of American Physicians, said he believes diphtheria to be primarily a

local affection, and that it is a filth disease. Conner¹²¹ regards it as constitutional.

Bruce Low¹⁰⁷ _{Mar. 15} relates a case showing the communicability of the disease, from a boy to his pet cat, thence to another cat, then to four children. Anderson⁹⁰ _{Apr.} says that, though the connection between diphtheria and the "pip" of birds has not been proved, yet he thinks that all putrescible matters should be removed from inhabited places, and all poultry or pigeons found affected with the least false membrane should be killed. Spear,²² _{Feb. 27} in a report on two epidemics of diphtheria at Aylsbury, gives as the reason of the re-appearance of the disease, that an excessive filth contamination of soil and air had been set up by reason of the sewers and drains so as to become the breeding-ground of diphtheria.

Nelson⁶¹ _{Apr. 8} says that by experimentation he has demonstrated that there exists a micrococcus of diphtheria which can be cultivated, and which, when inoculated in the guinea-pig, produces diphtheria. On the third day, after killing the animals which were the subjects of the experiments, a severe attack of diphtheria developed in himself. Spronck³ _{Aug. 21} inoculated a number of animals with the bacillus of Klebs, thereby causing albuminuria, which he considers a new proof of the fact that the bacillus is the cause of diphtheria.

In July, 1888, diphtheria broke out in the State Insane Asylum of Maine,¹⁰² and, in spite of isolation, cleansing, and disinfection, persisted for months, the last case occurring May 1, 1889; there were 64 cases in all, with an average number of patients in the hospital of 580. The disease was introduced into the institution by an attendant just recovering from a "simple sore throat," as it was diagnosed in the absence of medical attendance, and the prolongation of the attack illustrated how difficult it is to stamp out the infection of diphtheria under certain conditions. In regard to the facility with which this disease may be transmitted, Veil¹⁵² _{July 30} cites a case in which he carried the infection from one patient to another, entirely escaping himself.

Prophylaxis.—Blache¹⁴ _{July 7} says prophylaxis may be summed up in two words,—isolation and antisepsis. The same is said more elaborately by Bard²¹¹ _{Mar. 10} in the following conclusions:—

1. Prolonged isolation of the patients in special wards.
2. Isolation of the sick, and isolation, as nearly as possible, of the attendants.

3. Watchful care over those who may be sickening with the disease, —brothers, sisters, etc. 4. Special examinations of schools in order to eliminate any pupil with suspicious symptoms. 5. The immediate disinfection of the patient and his linen. 6. Extreme care of the attendants not to allow the disease to spread through them. 7. Thorough disinfection of all utensils used by the patients, as well as of the room, etc. Prudden ^{Apr., May} suggests that all bed-linen should be placed for twenty-four hours in a 2-per-cent. solution of carbolic acid, then boiled for an hour, then washed in strong soap-suds. Furniture should be rubbed, when permissible, with cloths wet with a 5-per-cent. solution of carbolic acid.

Complications and Sequelæ.—Brower ²³¹ cites as nervous sequelæ: Paralysis of motion and sensation, chorea, epilepsy, and insanity, occurring more frequently than in any other acute disease, always standing in the way of favorable prognosis, no matter how mild the primary disease may have been; he says that paralysis occurs in 40 per cent. of the cases. It may occur as early as the second day of the disease,—usually, however, not until two or three weeks after the disappearance of the throat symptoms. The prognosis is favorable unless the paralysis involves the muscles of deglutition, respiration, or the heart. Morton Prince ⁹⁹ _{June 12} reports 2 cases of pseudo-locomotor ataxy following diphtheria.

Debovc ¹⁰⁰ _{Oct. 29} describes a case of hysterical hemiplegia with muscular atrophy. Bókai ¹⁵⁸ _{Aug. 11, H. 1} relates a case of diphtheria in a child of 8 years, complicated by convulsions and hemiplegia, and followed by pneumonia. Starr ⁵⁹ _{May 18} reports a fatal case of diphtheritic paralysis. Baginsky ¹⁵⁸ _{Aug. 11, H. 1} and Cassel each report 2 cases of uræmia following diphtheria. Walker ²⁶ _{Oct. 1} relates a case where diphtheria and typhoid fever co-existed, the diphtheria occurring first.

Kühn ⁴ _{Oct. 22} reports a case of diphtheria complicated with erythema multiforma. The rarest complication, however, is that cited by Fabre, ⁵⁵ _{Sept. 26} subcutaneous emphysema of the face, neck, and head.

Treatment.—Jacobi ⁵¹ _{Apr.} recommends papayotin for dissolving the false membrane. It is soluble in 20 parts of water, and may be injected, sprayed, or applied by means of a brush to the affected parts; also in greater concentration in 2 or 4 parts of water and glycerin in the nose, throat, and into the trachea through the tracheotomy tube; it should not be applied in powder.

Diphtheria of the nose is likely to result fatally unless con-

stant and energetic local treatment is employed early by means of disinfectant injections hourly for one or more days. Occasionally the membrane blocks up the nose so that it is impossible to inject, in which case a silver probe may be dipped in carbolic acid or wrapped in absorbent cotton moistened with a solution of 50- to 90-per-cent. carbolic acid, and pushed through the mass, after which the injection may be used; this may consist either of $\frac{2}{3}$ of 1-per-cent. solution of common salt, a saturated solution of boric acid, lime-water, papayotin, hypophosphite of soda, 5-per-cent. solution of peroxide of hydrogen, or one composed of hydrarg. bichlor. 1 part, sod. chlorid. 35 parts, and water 5000. These solutions should be warm when used, and Jacobi recommends a short, stout, glass syringe, with soft-rubber mounting in front, as a most convenient means of employing this part of the treatment; a Davidson atomizer, however, will do.

Internal treatment should consist of a 2-per-cent. solution of peroxide of hydrogen or a 5-per-cent. solution of hyposulphite of sodium, 1 teaspoonful every two hours. Jacobi prefers the tincture of the chloride of iron to any other ferruginous preparation, as it is both astringent and antiseptic; an infant of a year may take 1 drachm (4 grammes) daily, and a child of 5 years 2 to 3 drachms (8 to 12 grammes); it should be given frequently, mixed with water, so that the dose is a teaspoonful every fifteen minutes or half an hour, or hour. Generally it is well borne. Vomiting and diarrhœa are contra-indications for its use.

In cases where there is naso-pharyngeal diphtheria, large glandular swelling, feeble heart, and frequent pulse through sepsis, associated with irritable stomach, when large doses of stimulant are required, leave off the iron,—which may also be omitted in cases of laryngeal affection; in this form the most useful internal remedy is mercury, preferably the bichloride. The smallest daily dose given by Jacobi was $\frac{1}{4}$ grain (0.016 gramme) to a baby of 4 months. One-half grain (0.032 gramme) daily may be given to a child of 3 to 5 years, for four to eight days or longer, the doses varying from $\frac{1}{60}$ to $\frac{1}{30}$ (0.001 to 0.002 gramme) grain, diluted to 1 in 6000 or 1 in 10000 in water or milk; there is no stomatitis, and if gastric or intestinal irritation occur, increase the dilution and employ small doses of opium.

Brower,²³¹ in a discussion before the Chicago Medical Society,

advises, for the treatment of the paralysis, electricity in the form of the mildest current. During the same discussion, Foster²³¹ recommended mercury, whisky, and quinine in the treatment of the disease, and Ingals and Waxham contributed strong testimony in favor of the employment of intubation. Casselberry emphasized the fact that sometimes during the process of intubation the membrane is pushed before the tube, leading to instant cessation of respiration; then, of course, tracheotomy should be performed at once.

D'Espine²¹⁴ found that Loeffler's bacillus is killed by five minutes' contact with a solution of acid. salicylic., 1 to 2000; on this his treatment is based. The naso-pharynx is bathed, every hour or two, with a solution of 1 to 2000 of salicylic acid by means of an irrigator or syringe; the solution may be poured into the nostrils by means of a spoon. According to a report by André²¹³ of an epidemic of diphtheria in the camp of the 12th Chasseurs, the treatment consisted of local applications of a solution of perchloride of iron twice daily, and frequent irrigations of a saturated solution of boric acid.

Shorts¹⁸⁵ gives mercury in the form of calomel in large doses, 5, 10, to 15 grains (0.32, 0.65, to 0.97 gramme), repeated every two or three hours until greenish stools are obtained; by combining with this from 5 to 8 grains (0.32 to 0.52 gramme) of chlorate of potash salivation is avoided.

In a discussion before the Kings County Medical Society, Sullivan and Brinkman⁴⁰ advocated strongly the employment of calomel by sublimation after the following manner: Place the patient under a tent, and fumigate with $\frac{1}{2}$ drachm (2 grammes) of calomel every three or four to six hours.

Wigg and Hamilton²⁶⁷ are among those who have employed the bichloride with good result. Porter⁷⁰⁰ advocates the use of calomel in oft-repeated small doses. Guelpa,²⁴ in a *résumé* of 3 cases of diphtheria occurring in one family, all of which terminated favorably, arrives at the conclusion that irrigations of the throat and nose every half hour, or oftener, day and night, are of the utmost importance. Osborne⁵⁹ advises the local and constitutional employment of sulphur: constitutionally, in the form of sulphide of calcium, sulphurous acid, sulphite or bisulphite of soda, or washed sulphur itself; and, locally, using either sulphurous acid or sulphur

in powder, for the application of which he has devised a combination of tongue-depressor and tube for insufflation, which is very ingenious in idea and construction. Caldwell⁵¹ _{Feb.} reports 7 cases treated with

R Papain, 3ij (8.00 grammes);
 Hydronaphthol, gr. iij (0.2 gramme);
 Ac. hydrochlor. dil., gtt. xv (0.97 gramme);
 Aq. destil., ad 3iv (15.50 grammes)—M.;

sprayed into the throat every hour, unless the patient was asleep. All but one made good recovery. Scott,¹³⁹ _{Sept.} as a result of twenty-two years' observation, employs 2 grains (0.13 gramme) of permanganate of potash to the ounce (31 grammes) of water, applied to the affected parts by means of a mop of absorbent cotton.

D'Ortenzio⁵⁰⁶ _{June} gives internally benzoate of soda as a general antiseptic, and employs chloral hydrate locally.

Taking into consideration the small amount of food which patients with this disease are able to take, Renvers¹¹⁶ _{p.145} has adopted the plan of artificially feeding them by means of the stomach-tube, which, he maintains, should be commenced early in the disease. Heubner¹⁶⁹ _{p.181} recognizes a difference between diphtheria and scarlatinal diphtheria, and for the latter employs a method of treatment, first introduced by Taube, which consists in injecting into the tonsils a 3- to 5-per-cent. solution of carbolic acid about 0.5 gramme (7 minims) in amount, twice daily, by means of a hypodermic syringe with a long needle. These injections must be continued until the swelling of the glands has disappeared and the morning temperature has become normal. He claims to have diminished the mortality by this means from 35.5 per cent. to 10 per cent. Jacobi¹⁵⁸ _{B.I.I.6} believes that the internal administration of the bichloride in diphtheria holds the disease in check. Rondot⁷⁰ _{Aug. 18} employs the bichloride locally in a strength of 1 to 500, with the addition of insufflations of salicylic acid; internally he gives the bichloride in small doses, 4 to 6 milligrammes ($\frac{1}{16}$ to $\frac{1}{2}$ grain).

Leblond³ _{Aug. 21} says that the employment of resorcin by fumigation and by insufflation limits the extent of the pseudo-membrane, causes the glandular enlargement to disappear, and combats with efficacy the general poisoning. Gaucher³⁶⁰ _{Feb.} tears off the false membrane, and applies carbolic acid to the bleeding surface as often as necessary. Goldvög⁵³⁰ _{No. 6, p. 64} paints the affected parts with tincture

of iodine once daily; under this treatment, out of 46 cases he reports only 4 deaths. Langlois ³ _{Apr. 3} and Gonthier ¹⁰⁰ _{Aug. 10} favor the employment of inhalations of oxygen in diphtheria. Zannellis ²⁴ _{June 2} uses insufflations of iodoform. Burghardt ⁸¹ _{No. 17} during the past seven years has treated these cases by insufflations of equal parts of quinine and sulphur into the larynx, pharynx, nasal cavity, and upon the tonsils, twice daily, not allowing the patient to take anything into the mouth for two hours afterward.

Coleman ⁶¹ _{Feb. 25} claims that diphtheria establishes a tolerance for the bichloride; he begins with the administration of $\frac{1}{32}$ grain (0.002 gramme), and increases the dose until the disease is counteracted or held in abeyance.

Jules Simon, ¹⁴ _{Apr. 7} taking into consideration the recent researches of Roux and Yersin, divides the treatment into (1) prophylactic, under which head he regards everything pertaining to the hygiene of infants, and (2) treatment proper, which consists as follows: After cleaning the throat by means of a dry swab or mop, he applies the following mixture every hour during the day-time and three times during the night:—

R Ac. salicyl.,	0.50 to 1.00 part.
Alcohol,	q.s. to dissolve.
Glycerin.,	40.00 parts.
Infus. eucalypt.,	60.00 parts.—M.

Where the false membrane is very thick and adherent he touches it two to four times daily with

R Tinct. ferri chlor.,	
Glycerin.,	10.00 parts.—M.

Every two hours the swabbing is followed by warm irrigations of a solution of carbolic acid or lime-water; the former may possibly prove toxic in its action.

Simon also favors the employment of the spray or steam atomizer, using $\frac{1}{2}$ ounce (15.50 grammes) of the tincture of eucalyptus to 8 ounces (249 grammes) of water, for example; internally, 1 drop every hour or two of tincture of iron is given. When the glandular swelling is painful and extensive, the following ointment is rubbed in:—

R Ext. belladon.,	2.00 parts.
Potas. iodid.,	1.00 part.
Adipis,	30.00 parts.—M.

Hennig, ⁴ _{Feb. 16} with an experience of 1054 cases with a very low

mortality, employs a gargle of lime-water every hour, and, after every gargle, from 10 to 20 cubic centimetres (2.7 to 5.4 drachms) of lime-water internally, and ice around the neck of the patient. If the larynx be invaded, it is sprayed with lime-water.

The majority of writers now insist upon the removal of the false membrane, and for this purpose Crésantignes¹⁵² _{No. 90} has devised a brush, composed of a roll of absorbent cotton on a probe covered with flannel.

Seibert¹⁵⁰ _{Dec.} employs common salt in the treatment of diphtheria after the following manner: At his first visit he spreads a layer of fine salt over the tongue and tonsils, with the effect that after the first application the fever and pain diminish; twice daily he rubs in the salt by means of the back of the handle of a spoon until the surroundings are "corned," as he terms the process, thereby preventing the spread of the disease. Lindley⁹⁹ _{Apr. 12} uses insufflations of iodoform every three or four hours with success.

Stevens⁶ _{June 3} reports 2 successful cases of tracheotomy in diphtheria. *Apropos* of the effect of climate on the diphtheritic poison, Turner⁹ _{No. 9} says, as a result of his experience as an army surgeon for years in the high altitudes of Dakota,—from 1000 to 2000 feet above the sea-level,—that diphtheria there is the most fatal of prevailing maladies.

PERTUSSIS.

Treatment.—Leblond and Baudier²⁴ _{Sept. 29} treat whooping-cough by fumigations of resorcin, for the employment of which an apparatus, consisting of a small metallic cup over an alcohol lamp, is used; in this the resorcin in powder is placed, about 15 grains (0.97 gramme), every two hours day and night. They say that the disease treated after this manner rarely lasts five weeks.

Baginsky,¹⁵⁸ _{E. 10, N. 6} after employing resorcin in 8 cases with only 1 cure, and no effect whatever in the others, does not recommend it. He tried brushing with cocaine in 11 cases with good results, but alarming intoxication was observed even after the administrations of small doses. Baginsky had the best success from insufflations of pulvis resinæ benzoas; in some cases cures resulted in from three to six days; in the majority, in about three weeks.

Stepp²⁹⁷ _{No. 62} believes that bromoform is superior to any remedy yet proposed for whooping-cough. Bromoform is a clear, limpid fluid, not specially disagreeable; specific gravity 2.9,—double that of

chloroform. The chemical formula is CHBr_3 . The odor is agreeable and the taste slightly sweet. Stepp tried it in 70 cases of whooping-cough in children, between the ages of 6 months and 7 years, with the greatest success. At the end of a few days the fits diminished, and in three weeks the patients were well. The following formula was employed:—

R. Bromoform.	.	.	.	.	.	.	gr x (0.66 grammes).
Alcohol,	.	.	.	.	.	ʒj	(2.00 grammes).
Syr.,	.	.	.	.	.	ʒss	(15.50 grammes).
Aqua,	.	.	.	.	.	ʒij	(93.00 grammes).

M. Sig: One teaspoonful every hour.

In a recent editorial²⁸² *oct.* a *résumé* is given of the results obtained by a number of observers in the treatment by antipyrin, with the conclusion that neither the intensity or the number of the paroxysms are in any way influenced, and the treatment, besides being practically inoperative, is attended by greater or less danger.

Jacobi⁵¹ says that he prizes belladonna as the most powerful remedy in whooping-cough, and he always returns to it after having discontinued it for the purpose of trying one after the other of the many remedies recommended from time to time. To produce a cure he gives the remedy in a dose sufficient to produce erythema after every dose. Infants of 6 or 8 months require $\frac{1}{6}$ grain (0.01 grammes) of either the root or the alcoholic extract, three times a day; children 3 or 4 years tolerate three doses each of $\frac{1}{2}$ grain (0.032 grammes). He gives the medicament as a powder, or has the extract dissolved and sweetened, or the tincture of belladonna may be used; a child of 2 years may take three doses daily, the first of which may be 6 drops. If the flush be perceptible in twenty to thirty minutes, that is the dose; if not, the number of drops must be increased to obtain this effect after each dose, and in a few days larger doses will be required.

Sulphate of atropia may take the place of belladonna, commencing in a child of 2 years with the $\frac{1}{60}$ grain (0.00065 grammes) three times a day, and increasing according to the above rules.

Illingworth², believes belladonna to be of great service in cases where there is much tendency to collapse, as shown by clammy skin, cold extremities, and puffiness of the face; but is no remedy for the first stage. He finds carbolic acid useful in all stages of the disease on account of its antiseptic and anæsthetic properties.

Rothe¹⁴, also employs carbolic acid in combination with iodine in the following mixture:—

R. Ac. carbol.,	.	.	.	.	.	gr. xv	(0.97 gramme).
Spt. vin.,	.	.	.	.	.	vj. xv	(0.97 gramme).
Tinet. iodin.,	.	.	.	.	.	gtt. x	
Tinet. bellad.,	.	.	.	.	.	vj. xxx	(1.94 grammes).
Aq. menth. pip.,	.	.	.	.	.	5ij	(8.0 grammes).
Syr. opiat.,	.	.	.	.	.	5iiss	(10.0 grammes).

M. Sig.: One teaspoonful of this is given to children over 2 years of age every two hours.

Lee²,₅₀ says that the proper mode of administration of the carbolic acid is in the form of vapor: boil a solution of carbolic acid in water, in the proportion of from 1 to $1\frac{1}{2}$ per cent.

Heimann³⁴,_{Mar. 19} reports successes which he has obtained by the administration of phenacetine, promptly checking the paroxysms.

Carr, of New York,⁶,_{Nov. 16} mentions 2 cases where he used a 4-per-cent. solution of cocaine applied by means of a swab to the throat, with success, just after each paroxysm of coughing, but the use of this drug has fallen almost completely into disrepute.

It is very interesting to note the change which has taken place during the past year in the treatment of whooping-cough. Then antipyrin was heralded as almost a specific; later experimentation over a wider field has proved its inefficacy, and antiseptic inhalations and a return to the old belladonna treatment are now advocated.

Complications.—Fritsche³⁶⁶,_{B.29, H.3, 4} reports a case of pertussis complicated with unilateral spasms, paresis of the right facial nerve, aphasia, hemianesthesia, and disturbance of vision and hearing. The patient recovered. Mireoli⁵⁰⁵,_{June 13} declares that the kidneys are affected in whooping-cough in about 12 per cent. of cases occurring in children, and believes that the renal affection is due to venous stasis, caused by obstruction of the vena cava through the violent paroxysms of coughing.

PAROTITIS.

Incubation.—Dauchez³⁵,_{Mar. 14} noticed that the period of incubation is fifteen days on the average. Jacobi⁵¹,_{Feb.} says that the incubation lasts a fortnight and sometimes three weeks. Nicholson⁶,_{Jan. 5} reported an interesting case in which an interval of six weeks elapsed between the affection of the two sides.

Etiology.—Milonas,⁸⁰⁰,_{Apr.} at a meeting of the St. Petersburg Naval Medical Society, related an interesting case of swelling of the

parotid gland, occurring in a nervous and debilitated patient, a few hours after it had become necessary to catheterize him, while suffering from a prostatic abscess. In about a week, when it again became necessary to employ the catheter, it was rapidly followed by the development of a suppurative parotitis of the other side. During the discussion which followed, Balinsky related 3 cases of reflex parotitis which had occurred in his own practice, the patients being women who had undergone some operation for the relief of genital troubles.

Complications.—Demme³⁹² saw 117 cases in an epidemic occurring between June, 1887, and May, 1888. Two cases which resulted fatally were complicated by gangrene of the parotid glands; in 3 others, large abscesses found in the cervical regions; in 2 other cases, when the disease was disappearing, an acute nephritis occurred, presenting the characters of a scarlatinal nephritis; finally, 1 case was complicated by an acute purulent otitis, with perforation of the tympanum. Musgrove¹⁸⁶ and Slagle¹⁸⁶ report 1 case each of death following mumps from acute uræmic poisoning. Percy Smith^{6, 10} relates 2 cases of insanity following mumps, due, he thinks, to the extreme exhaustion caused by the complications of the disease; great diarrhœa in 1 case and severe orchitis in the other. Parrott² reports a case of mumps complicated by orchitis and meningitis, the patient making a good recovery.

F. W. Brown,²⁸⁴ during an epidemic, had 20 cases in the hospital of a military school; of these cases, when the parotitis began to subside, 10 developed orchitis; in 9 of the cases the orchitis developed on the side corresponding to that in which the parotitis first began to subside; in the tenth case the reverse occurred, and this became a double orchitis, which is rare.

Day⁹ reports a case of what he terms an acute idiopathic parotitis, autogenic in origin, occurring in a woman of 32 years, of a strumous diathesis, resulting in complete and entire sloughing of the gland by a gangrenous process, with ultimate recovery.

Treatment.—Jacobi⁵¹ says that when there is a good deal of pain, narcotic applications may be made, or ice applied; he sometimes applies iodoform collodion (1 to 8 or 10) twice daily over the whole surface. F. W. Brown²⁸⁴ observed the most marked benefit in cases of acute orchitis, complicating mumps, from lying in bed with the testicles slightly suspended.

RHEUMATISM AND GOUT.

BY N. S. DAVIS, M.D., LL.D.,
CHICAGO.

A CUTE AND CHRONIC RHEUMATISM.

Etiology.—Since the investigation of Popow concerning the existence of micrococci in the blood of persons affected with acute articular rheumatism and their etiological significance, as stated in the ANNUAL for 1889, vol. i, I have found in the current medical literature no additional direct investigations on the relations of micro-organisms to rheumatism. Several writers have expressed their confident belief in the bacterial origin of rheumatism, but have added no new facts giving direct support to their belief. Some of them, like T. E. Craig,⁵² of Lawrenceburg, Ind., not only assume that bacteria constitutes the specific cause of rheumatism, but proceed to found on that assumption ingenious theories of its pathology and treatment. Thus, Craig says he "regards acute rheumatism as a typical germ disease. The germs, by elective affinity, find lodgment in the lymph-spaces, and in the lymph-spaces alone, more especially the synovial sacs." In these spaces and sacs he represents the germs as exciting not true inflammation, but *engorgement* of the tissues with serous effusions and consequent heat, tumefaction and pain, during the continuance of which a *ptomaine* is engendered that is carried in the venous blood through the right cavities of the heart to the lungs, where contact with air or oxygen from the air-cells adds to its toxic or irritant qualities, thereby causing it to act as an excitor of true inflammation in the left endocardium, while the right endocardium remains unaffected. While Craig's paper is interesting and plausible, it would have been much more satisfactory and valuable if he had, by direct microscopic and chemical investigation, identified the actual pathogenic germs in the lymph-sacs and the ptomaine in the endocardial structures.

Per contra, Leonard Weber, of New York,⁵³ states with equal
(K-1)

positiveness that "bacteriological research has not succeeded in advancing our knowledge of the etiology of rheumatism," but declares that "it belongs to the class of miasmatic infectious diseases, assuming an epidemic-like character at certain times, in so far as we are apt to see a larger number of cases when there is decreasing rain and moisture, while with an increase of the same the number of cases is diminished." He cites, in support of this declaration, the opinions of Edlefsen, Friedländer, Hirsch, Mantle, Feltkamp, and Jürgensen, as expressed in the Fourth German Congress for Internal Medicine, in 1885, and yet neither Weber nor any of those whose opinions he cites have furnished any information concerning the identity or nature of the supposed *miasmatic infection*.

Pel, of Amsterdam,²⁵ not only claims that the disease depends on a miasmatic infection, but that such infection bears some relation to, if not identical with, the *bacillus malariae* of periodical fevers. He shows, from the records of the Amsterdam Hospital, that in those years when malarious fevers were most prevalent there was the smallest number of cases of rheumatic fever, and *vice versa*; and also that the special times of greatest prevalence of rheumatism were generally from five to ten days after a copious rain-fall, which would correspond with the time when miasms or infections developed in the soil would be returning into the atmosphere, and therefore exerting their most direct influence upon the inhabitants. But, while the number of recent writers and observers who assume that the efficient cause of acute rheumatism is either a miasmatic infection or a micro-organism is increasing, B. W. Richardson, of London,²⁶ gives an interesting review of his former experimental researches regarding the etiology of rheumatic fever, and concludes with the following words: "Such is the sum of the observations I made on the influence of lactic acid on animal bodies, and, reviewing the whole after a lapse of many years, the inference is as clear to me as it ever was that the secondary action of lactic acid as a cause of rheumatic disease is proved."

To complete the circle of contradictions, however, Alexander Harkin, of Belfast,²⁷ discards alike the etiological influence of bacteria, miasmatic infection, lactic acid, or any other acid in the blood, and re-asserts the efficient causative influence of sudden atmospheric changes or chilling. He says: "I consider the exciting

cause to be a chill, and that the morbid effect is produced through the agency of the nervous system."

Pathology and Pathological Anatomy.—Harkin, in the paper from which I have just quoted,²⁶ expresses his views of the pathology of acute rheumatism as follows: "I have already recorded my opinion that the proximate or exciting cause of acute rheumatism is a chill, and that the morbid effect is produced through the agency of the nervous system; that it is essentially a specific form of endocarditis; and that the cardiac affection is not merely an incident or an occasional complication, but, in reality, the initial or seminal principle from which spring up the myocardiac, arthritic, pericardiac, pleuritic, meningeal, and other occasional developments and complications of the disease. I believe that endocardial inflammation is always present in acute rheumatism, but not always recognized and not always recognizable in its early stages, but that in such cases its presence is always to be presumed and taken into account, and provided for by appropriate treatment."

If, as stated in the foregoing paragraph, the endocardial inflammation "is not always *recognizable* in its early stages," nor indeed in any stage of many cases, on what basis of legitimate reasoning can the endocardium be claimed to be always the primary seat of the disease?

T. E. Craig⁵³ claims that the pathological condition of the articular structures in rheumatic fever, manifested by tumefaction, heat, and pain, is not one of inflammation, but only of engorgement. He says: "In the joints we have a simple serous effusion containing a few epithelial cells, except when thrombi in the surrounding small blood-vessels may set up destructive changes; but in the heart and pericardium we have a true inflammation, with nerve-tissue adhesions and organized lymph on the valves of the heart and subcardium, as well as, in a certain per cent. of cases, in the pericardium." In his view, the engorgements and exudations in the articular structures are first in the order of pathological changes and are the direct result of the action of organic germs in the synovial sacs, while the cardiac inflammation is caused by ptomaine resulting from microbial action in the articulations and conveyed from thence in the blood to the cardiac structures.

B. W. Richardson,²⁸ says that "the action of the poison in ordinary rheumatism is local, *i.e.*, by direct action on the fibro-

serous surface; for, if the poison were conveyed by the blood through the coronary circulation, in the case of the heart, both sides of the heart should suffer alike, which is contrary to observed fact, and that such poison should be looked for in the arterial instead of the venous blood. In his experiments on animals with lactic acid, by which rheumatic endocarditis was induced, he had opportunities of observing such inflammation in the several stages of its progress.

"From these observations it was found that endocarditis has three well-marked periods of progress. The primary stage is one of congestion and œdema. The endocardial surface is intensely vascular, approaching in color to bright vermillion. The curtains of the valves are in a swollen and vascular state, which Halford very appropriately called an œdematosus condition." In the second state, he says: "The endocardial surface lost its intense vascularity, but presented points at which the tendinous cords were bound down to it by loose adhesions. The intense redness shaded down to a pale pink, the membrane, superficially, being of the pink color, while beneath it there was a pale film, which shaded through it. The curtains of the valves remained thickened, but less red. Their surface externally was pink above, while beneath the membrane there was a pale, fleecy appearance, evidently from the presence of clear and semi-solid lymph-like exudation. Sometimes the thickened valve was firmly bound down to the heart-wall by firm exudative bands. In this stage, also, the beads around the margin of the valves assumed the same characters and appearances as the curtains of the valves themselves; they were firmer, and pink on their external surface, with a curtain of pale exuded lymph as the background." In the third stage, or that of resolution, "the vascular character of the membrane, externally, was removed entirely. The exuded product beneath became firmer, and both curtains of valves and beads assumed for a time considerable firmness and a pearly whiteness. Later, these parts softened down, as if from absorption of the exuded matter. The curtains of the valves recovered their normal characters first; the beads remained longer, and often gave rise to a loud, musical, systolic bruit, which conveyed the idea of a much more serious amount of valvular disease than was really presented on inspection. In this stage the general symptoms of the disease quickly disappeared."

Among the more interesting contributions to the literature of rheumatism during the past year are the Harveian lectures on various manifestations of the rheumatic state, as exemplified in childhood and early life, delivered at the Harveian Society of London, by W. B. Cheadle. ^{Apr. 21 to May 11} ⁶ The lecturer claims that rheumatism in some of its manifestations is of frequent occurrence in childhood, although the acute articular form he admits to be comparatively rare. He says ⁶ _{Aug. 27}: "The most complete and comprehensive manifestation of the various phases of rheumatism belongs, indeed, to the period of childhood; it appears then under the simplest conditions, and this presentation of the disease should be regarded as representative, and the changes which take place in the phenomena with advancing age regarded as modifications of the earlier and more perfect form. There are certain affections which have been observed to be so frequently associated with acute rheumatism that the existence of some pathological connection between them has come to be very generally accepted, although the extent and intimacy of the association may be a matter of controversy." As the most important of such associated affections he names "endocarditis, pericarditis, pleurisy, tonsilitis, exudative erythema, chorea, and subcutaneous nodules;" and he adds: "I do not say that the rheumatic poison, or whatever the morbid influence may be, is the sole cause of these affections associated with rheumatic arthritis, any more than it is the sole cause of inflammation of joint structures." Cheadle explains further thus: "It appears, then, that the rheumatic virus (whatever its exact nature and by whatever physiological machinery it acts) which produces the articular inflammation produces in like manner inflammation of the fibrous tissue of the pericardium, endocardium, and pleura, and that of fasciae and tendons. It has clearly an irritant, inflammatory effect upon fibrous tissue, not of the joints alone, but of these other structures. It affects, moreover, mucous membrane and skin, and disturbs nervous centres. The conception of rheumatism, then, which I shall endeavor to put forward and establish is this broad one: that the terms 'rheumatism' and 'rheumatic' must be held to include many various expressions,—the series of phenomena I have laid down,—and must not be regarded as a special inflammation of tendons and ligaments or synovial membranes, or a condition of which this is always the chief feature, accompanied by complications and sequelæ.

The term 'diathesis' is quite inadequate; there is something more than mere tendency—a common factor concerned in the production of these different phrases, and forming the link between."

Cheadle discusses at length what he calls the various expressions or manifestations of rheumatism in childhood, and illustrates them by numerous cases, but he does not attempt to add anything to our knowledge of the causes or essential pathology of the disease. In his third lecture⁶ _{May 11} he gives the following account of the anatomical changes in the valves in endocarditis and in subcutaneous nodules: "The inflammatory process in the valves, as Barton ventured to anticipate seven years ago, appears to be identical with that met with in the nodules, viz., nuclear proliferation, cell infiltration, spindle-cells in process of transformation into fibrous tissue, wavy bands of fibres and vessels. The microscopic appearances of a thin section of the mitral valve of a patient show the proliferation and cell infiltration of the fibrous tissue which forms the framework of the valve as the most conspicuous feature, and it is to the proliferation of this layer that most of the swelling is due. There is, moreover, infiltration of the whole thickness of the valve with round cells, nuclei, or leucocytes. In some specimens there can be seen distinct proliferation of the endothelium, and in some a deposit of fibrin on the surface in which leucocytes are visible. But the chief change—that which causes the thickening and rigidity—is the proliferation of fibrous tissue, which is the leading feature of the morbid process seen in the subcutaneous nodule."

A leading article says²² _{Jan. 16}: "We are profoundly ignorant of the recondite pathology of both rheumatism and chorea, and it is possible that, after all, we have to do in both cases with a nervous disorder which sometimes assumes one and sometimes the other form."

Treatment of Acute Rheumatism.—In reviewing the therapeutics of acute rheumatism in the literature of 1889, I find very little that is new, but considerable detailed results of further clinical experience with the whole salicyl group of remedies, all of which confirm the correctness of the conclusions stated on page K-7, vol. i. of the ANNUAL, 1889, viz., that the beneficial effects of the class including salicylates, antipyrin, antifebrin, salol, etc., are limited to an early relief of pain and pyrexia, without materially shortening the time of the patient's confinement or

in any degree lessening the ratio of relapses and cardiac complications, and consequently their use should not prevent or delay the efficient use of such alkaline salts and alteratives as will neutralize the excess of acidity and promote efficient action of the chief organs of excretion. Concerning treatment, Alexander Harkin ²⁶ _{Jan. 1, et seq.} says: "Recognizing the disease as one originating in cardiac inflammation, my aim has been to subdue it by counter-irritation and depletion before the development of the inflammation has lapsed into organic change. My treatment is of the simplest kind, the application of a blister, 4 by 3 inches (10 by 7.5 centimetres), for eight hours to the cardiac region, followed immediately by cotton-wool dressing, preceded, if in plethoric patients, by leeches in the pericardial regions or cupping at the back in the space between the inferior angle of the scapula and the spinal column; but bleeding is the exception, and this remedy often succeeds in removing all special symptoms, whether subjective or objective, in the space of twenty-four or forty-eight hours. As to the *rationale*, it appears to me that the blister effects the cure by its acting as a depletive, a counter-irritant, a revulsive, and derivative." ²⁶ _{May 1} Harkin illustrates the effect of his treatment by the relation of 16 cases at the close of his paper. The treatment of acute rheumatism by blistering and other modes of counter-irritation has been strongly recommended at different times during the last half century by some men of eminence, but it has never gained popularity.

In the Medical Society of the County of New York, A. Jacobi read an interesting paper on rheumatism in infancy and childhood, ⁵⁹ _{May 12} giving chief attention to its treatment. He recommends for the little patients warm clothing and bedding, careful protection from cold or damp currents of air; sometimes the ice-bag or a cold wet cloth to the affected joints, the wet cloth to be changed every half hour or hour, and, in anaemic children, warm cloths instead of cold ones. Joints that are excessively painful may be wrapped in cloth wet with solution of morphine or chloroform and covered with oiled silk. Concerning internal remedies, he says: "As a rule, salicylate of sodium hastened the disappearance of pain and swelling, but it ought not to be tried longer than from three to five days. Sulphate of quinine was sometimes indicated. Alkaline salts or mineral waters were called for, as

Vichy, bicarbonate of sodium, or one of the nitrates. Iodide of potassium and sodium had been justly recommended, particularly when there was a tendency to chronicity. Absolute rest he insists upon whenever there is cardiac complication.

Cheadle,⁶ in the Harveian lectures, to which reference has previously been made, devotes but a few paragraphs to the subject of treatment. He says: "Whenever there is suspicion of rheumatic inflammation—even if no cardiac affection be perceptible—enforce absolute rest in bed. Complete physical repose and external warmth are of the first, possibly of vital, importance. With regard to drugs, I may point out that the heroic treatment by large and repeated doses of salicylate of soda is rarely called for in the rheumatism of children, since the articular affection is usually slight and the pyrexia, as a rule, not severe; for the salicylates appear to exert no favorable influence upon any rheumatic phase except, only, arthritis and tonsilitis. Salicin may be given in place of the salicylate of soda in most articular cases with advantage, as being less depressant, and, with salicin, alkalies."

John Aulde, of Philadelphia,⁹ recommends the *rhus toxicodendron* as a valuable remedy in subacute and chronic cases of rheumatism and sciatica. He uses the tincture prepared from the fresh leaves, in $\frac{1}{2}$ -drop doses, three times a day.

Trastour,³⁵ insists upon the necessity for movement, in spite of pain, in the treatment of chronic articular rheumatism. He considers it essential that the treatment should be commenced before adhesions had formed between the articular surfaces, and, even then, he does not regard them as necessarily incurable. He requires his patients to exercise each joint affected for a time, daily, and claims to have treated a large number of patients by such exercise with most gratifying results. Many cases of all grades of rheumatism have been reported from the clinics both in this country and Europe, instructive for clinical purposes, but embracing nothing not already familiar to the profession.

GOUT.

Etiology.—A. Haig, of London,⁴⁰⁸ gives the results of some clinical observations and analyses still further confirmatory of the doctrine that the essential exciting cause of gout is an excess of uric acid in the blood and tissues, and that all such medicines and articles of food or drink as lessen the solubility and elimination of

the acid favor the development of the disease. He says: "We can say with absolute certainty that it was the acid in these beverages (wine, ale, or porter) that produced the arthritis, and we can produce it with acids taken in other forms. We can also show that other drugs, as lead and iron, having nothing in common with acids but their effect on the solubility of uric acid, will produce similar effects; and we can further show that when an acid is given the excretion of uric acid in the urine diminishes in relation to the urea, hour by hour, as the pains come on and increase; and we thus come to be certain that the pains are the result of a retention of uric acid, the joints being one of the places in which it is retained." There appears great unanimity of opinion on the part of contributors to the literature of gout, the past year, regarding the action of uric acid as the exciting cause, and of hereditary influence, the use of fermented liquors, and of deficient physical exercise as predisposing causes.

Pathology and Pathological Anatomy.—Since the investigations of Garrod, nearly all writers have coincided with him that all active gout consisted in irritation or inflammation induced by the presence of the uric acid or urate of sodium in the structures affected, whether the articulations, the internal viscera, or the skin. But at the German Congress of Internal Medicine, held at Wiesbaden, in April, Ebstein^{9 May 18} read an interesting paper, in which he claimed uric acid was a tissue poison that produced necrosis instead of inflammation of tissues, and, instead of the presence of tophi or deposits of urate of soda causing inflammation and tumefaction, such deposits took place only where necrosis had already been induced. At the same congress a paper was read by Pfeiffer, of Weisbaden, in which he declared his disbelief in the necrotic process in gout as stated by Ebstein. He claimed that when necrosis of tissue occurred during an attack of gout it was generally the result of traumatic lesions.

Treatment.—The hygienic management of gout has long been regarded as of primary importance. The value of active, physical exercise, clothing well adjusted to the atmospheric conditions, cleanly and well-ventilated rooms, cheerful mental occupation, entire abstinence from alcoholic beverages, especially those of the fermented class, and a suitable diet, are recommended by all.

Until recently, a diet chiefly of the vegetable class, with a

sparing quantity of meat, has been very generally recommended. Almost the only noted exception to this has been on the part of G. Mortimer Granville, London, who has for several years claimed that a liberal use of meat and albuminous food was decidedly more favorable for gouty subjects than a diet of an opposite character. But it now appears, from the more recent clinical observations of A. Haig, Ebstein, and Pfeiffer, to whose papers we have already referred, and nearly all other writers of the past year, that a diet largely of hydrocarbonaceous elements directly increases the amount of uric acid and decreases the excretion of urea, while the use of meat and albuminous substances generally increases the elimination of urea and diminishes the amount of uric acid in the blood and tissues.

Legrand ²⁴ _{Apr. 28} closes a long article with the following propositions: 1. The presence of uric acid in the blood and urine is physiological. 2. Excess of uric acid in the blood is harmless if the elimination is not obstructed. 3. In disturbing the kidneys and diminishing the eliminating force of these organs it leads to gout. 4. It is possible that iron has the same effect; by causing plethora, will also bring on gout. Plethora diminishes the volume of the kidneys and impairs the eliminating function. Since Todd first called attention to this point all the autopsies of gouty patients have shown the kidneys to be reduced to two-thirds, sometimes to one-half, its normal size. This is the cause of the gout, not its result. 5. Treatment for gout consists in re-establishing by all possible means the renal function.

In acute attacks of gout Ebstein recommends the salicylate of sodium as most efficient for early relief of the pain and fever, and in this he is sustained by many others. After the acute stage has passed, and in the more chronic forms of the disease, A. Haig recommends the administration of pure phosphate of soda for the purpose of increasing the elimination of the uric acid. In a paper read to the Royal Medical and Chirurgical Society of London, ⁶ _{June 8} he detailed many interesting facts, showing that if the phosphate of soda contained any mixture of the sulphate, or an excess of dilute phosphoric acid, it would fail to produce the desired increase of elimination of the uric acid. The excess of phosphoric acid might be easily rendered harmless by adding bicarbonate of soda to each dose of the phosphate.

DIABETES.

BY JAMES TYSON, M.D.,
PHILADELPHIA.

DIABETES MELLITUS.

Etiology.—The literature of the year abounds in illustrations of the effect of injuries of the nervous system in producing diabetes. Thus, William Hunt⁶² presented at his surgical clinic at the Pennsylvania Hospital, Philadelphia, a boy of 17 with all the symptoms of diabetes succeeding a *blow on the abdomen*. D. G. Luce⁷⁶⁰ reports the case of a healthy lad who fell while skating, *striking the back of his head* heavily on the ice. Diabetes followed and was fatal. Again, Bacelli²⁶ quotes the case of a young man who suffered a *concussion of the brain* and afterward became diabetic. He died, and a necrobiotic point was found in the centre of the pons Varolii. Vogel, in the discussion of von Ziemssen's paper³⁴ before the Munich Medical Society, reported the case of a fireman *upon whose neck a beam fell* while at a fire, as a result of which he was brought unconscious to the clinic, but a few days after seemed to be entirely well. In a few weeks there appeared a severe diabetes, and in the course of time the man died of it. At the autopsy nothing was found abnormal in the medulla oblongata, and it was thought that diabetes resulted from a *concussion of the spine*.

A. B. Sweet¹ reports a case of diabetes following *obstructive jaundice* in a man of 59. There was acute pain, enlargement of the gall-bladder, and constipation, finally overcome by 5-grain (0.32 gramme) doses of calomel and jalap. This attack, lasting from twelve to fourteen days, was followed by another, lasting eight to ten days. During convalescence, four or five weeks after the beginning of the relapse, the quantity of urine was noticed to have increased and the urine itself to be of a specific gravity of 1040, and to contain 2 to 3 per cent. of sugar. Under prompt treatment by diet and codeine he ultimately recovered completely.

Ivan Michael³²⁶ details the case of a strong man, aged 20, who

sickened, without apparent cause, with diabetes of moderate degree. After the disease had existed three months he became very weak and sought admission to the hospital. While there he had inflammation of the middle ear, but improved so much that he was discharged at his own request after three months. A few days later, however, the ear trouble returned, with extreme weakness and exhaustion, the patient dying comatose two days after re-admission and about six months after the first onset of the disease. The urine contained $2\frac{1}{2}$ per cent. of sugar, and there was a distinct reaction of acetone. At the post-mortem examination a *cysticercus cellulosus* was found in the fourth ventricle, with extensive granulations and polypoid growths of the same part. With the exception of occasional headaches, there were no symptoms of head affection. According to Steinbrügge, inflammations of the middle ear are not very infrequent in diabetes. Several cases of cysticerci in the fourth ventricle are reported without melituria, but in 1 case diabetes insipidus was present.

James McNish²⁶⁷ _{App.} reports a case of a blacksmith, aged 56, who suffered a *burn* of the second degree on the whole of the right hand and forearm up to the elbow-joint. Glycosuria supervened twelve days after the accident, together with polyuria and weakness. The increased micturition and polyuria disappeared after the wound began to do well as suddenly as they had appeared.

Jacques Mayer¹¹⁴ _{B.14,p.212} has endeavored to ascertain whether an etiological connection could be traced between *heart disease* and the principal symptoms of diabetes, viz., glycosuria and azoturia. In 82 out of 390 cases examined hypertrophy or dilatation of the heart was found. He also found hypertrophy and dilatation present in a number of cases without morbid changes in other organs, such as the kidneys and arteries, which are frequently responsible for hypertrophy and dilatation. He ascribes these changes to the glycæmia and azoturia of diabetes. The records of the Pathological Institute of Berlin show, in 10 per cent. of the diabetic cases which proved fatal in the Charité Hospital, hypertrophy of the heart without valvular disease and without affection of the arteries or kidneys.

Von Ziemssen³¹ _{Jan.1} gave his views concerning the origin and nature of diabetes to the Medical Society of Munich. He thought it was especially in the *medulla oblongata*, but probably also in the cerebrum, that we are to look for the origin of diabetes

mellitus; but there are certain facts which go to show that the *mode of life* and the nationality are very important. Thus, there are certain districts in Italy and in Germany, Wurtemberg and Thuringia, in which diabetes is especially frequent. Especially has it been observed that the Semitic race is much more subject to diabetes than the Arian, but whether conditions of nutrition play any part here is very doubtful.

Nature and Pathogenesis.—Von Ziemssen,³⁴ from a clinical stand-point, divides diabetes into at least *two forms* essentially different,—a *milder* and a *more severe* form. The milder form is found more frequently in older persons, the severe in the young. The former cannot be regarded as dangerous or shortening life. In this form there is neither thirst nor hunger, only a feeling of discomfort,—not constant, but recurring from time to time with nervous or neurasthenic symptoms, so that the physician often never suspects the presence of sugar. Another symptom of these cases to which von Ziemssen had previously called attention is neuralgia as well as trophic derangement. Such are necrotic foci, troublesome and painful ulcers of the toes, without disposition to heal.

In an able lecture before the first congress of Italian physicians at Rome, Arnold Cantani,⁶⁹ the acknowledged Italian authority on diabetes mellitus, reported his views based upon his experience with 1004 cases. He believes that in diabetes mellitus we have a non-combustion of carbohydrates, whether introduced from without or produced within the organism. The fact that the ingestion of sugar is always followed by its appearance in the urine at a very short interval disposes, according to him, of all theories which make diabetes the result of increased sugar production in the tissues. From a study of these (more than 1000) cases, he is convinced that diabetes consists, in the first place, in the non-combustion of some part of the carbohydrates, the excess of non-assimilated sugar appearing in the urine. As the disease progresses, a smaller and smaller amount is burned, until none is oxidized. Then the sugar found in the urine corresponds exactly to the quantity ingested, and, by varying the ingestion of sugar, its excretion is increased or diminished. It is on this account that in the beginning glycosuria is often intermittent, inasmuch as that in certain meals more sugar is consumed and in others less. Later, the diabetes is constant, but the quantity of sugar varies with the

amount of sugar-forming materials ingested. But even here the sugar may be made to disappear after a time by the use of an absolute meat and fat diet. Still later, not only does the diabetic excrete all the sugar corresponding to the carbohydrates ingested, but even with an absolute meat diet a certain amount of sugar is excreted in quantities corresponding with the amount of albuminoids ingested. At this stage, again, the withdrawal of all food is followed, at the end of twenty-four to thirty-six hours, by the disappearance of sugar. After the diabetic has ceased to burn up the carbohydrates, there comes a time at which even the fats which he eats cannot be digested and assimilated, and finally absorption ceases from the intestine in part or entirely, and even glucose, if introduced into the stomach or rectum, is not absorbed, and therefore does not appear in the urine. This progressive *deterioration* of the *chylopoietic organs* forms the likely cause of a general derangement of tissue-change which the constitutional or chylogenous diabetes presents, by which it is to be distinguished from the *symptomatic* or *neurogenous*. According to Cantani, the defect through which sugar fails to be so prepared that it can be thoroughly burnt up into carbonic acid and water is a micro-chemical vice. It may be that the process which prepares the sugar for combustion is defective, or the defect may be sought in the tissues, or it may be that the diabetic sugar, notwithstanding its similarity to glucose, does not possess the property of retarding oxidation. As in gout the albuminoid substances are not consumed in the normal manner, as in *polysarcia adiposa* the fat is not sufficiently burnt up, so is it in the diabetic with the carbohydrates. This non-combustion of the carbohydrates does not appear to diminish the sum total of the phenomena of combustion in the body, since the body-temperature maintains itself at 37° C. (98.6° F.) or but little below; in fact, in order to compensate for the non-combustion of the carbohydrates, the fat and albuminoids, everything, indeed, burns up except the sugar. Whence Cantani defines diabetes as a general disease, with its principal localization in the chylopoietic organs.

Contrasting his views with those of Ebstein, who claims that the diminished elimination of CO_2 , which is characteristic of diabetes, is the cause of the large sugar production, because in health the action of the diastatic ferment upon glycogen is held in check

by the CO_2 , Cantani declares that the diminished CO_2 is the result, not the cause, of the diabetic condition ; there is less CO_2 because there is less combustion of glycogen.

The so-called *neurogenous* diabetes has not, for Cantani, the same significance as the *constitutional*, or, as he calls it, the *chymogenous*. While the latter is the result of a prolonged and progressive incapacity of a functional character to burn up the sugar, neurogenous diabetes is a glycosuria called forth through the influence of irritated nerve-centres, especially the floor of the fourth ventricle, to which, however, it is not limited. In the great majority such glycosuria may be regarded as transitory. It may be caused, for example, by a brain-tumor. If, however, the central nervous lesion is chronic, the glycosuria is permanent, lasting as long as the irritation. It will be observed that the application of this term, neurogenous, by Cantani, is the reverse of that by some others, who speak of the mild and neurogenous forms, applying the latter term to the more serious.

Cantani's observations confirm all previous ones in the matter of the sex of the patients. Out of his 1004 cases, 837, or 83.37 per cent., were males, and 167, or 16.63 per cent., were females.

Referring to a statement of Arthur Fagge, that in order to have true diabetes we must not only have a rapid outflow of sugar from the liver, but also an increased formation of glycogen in the liver, James Anderson⁷⁶ says we must go back to the *nervous* centres, central and local, by which this action is controlled. It is to be remembered that there is both defect and excess, both *paralysis* and *stimulation*, under-action and over-action, at the same time. This is not like a lesion at the lower level of evolution, but is like one at the higher level, not only in the spinal cord, but also in the medulla and highest motor and sensory centres of the cortex,—in the anterior and posterior parts of the hemispheres, the part of the brain more properly termed the organ of the mind. Claude Bernard's experiment aids us in the solution. The immediate effect of a cross-cut lesion such as his puncture bears to the effect of slow, nutritional changes in the nerve-cell somewhat the same relation as the immediate results of section of the spinal cord to those of chronic transverse myelitis. In the first case we see only defect, paralysis ; in the second we have both defect and excess, both paralysis and uncontrolled action. The parallel seems a

close and instructive one, and we may venture to regard a rapid outpouring of sugar from the liver as a paralytic phenomenon, while the increased glycogenesis is an uncontrolled action. This diabetic glycogenesis is not only abnormal in amount, but it is also random in nature, like the jerkings and rigidity of spastic paraplegia,—that is, it is liable to exacerbation out of proportion to the stimulus.

G. Arthaud and L. Butte,³ in a paper read before the Academy of Sciences, having concluded from experimental researches that it is possible, by *centrifugal irritation of the vagus nerve*, to produce the different varieties of diabetes—insipidus, azoturic, and glycosuric—according to predisposition of the individual, just as in man, now add that through their recent researches they have been able to verify, in almost every particular, the analogy of these experimental diseases to spontaneous diabetes, for which they have adopted, without reserve, the nervous theory.

The rôle played by the *pancreas* in producing diabetes mellitus for some time insisted upon by Lancereaux seems likely to be supported by experimental research, as shown by the results of von Mehring and Minkowski,³⁹² who extirpated the pancreas in dogs. They found that diabetes begins a short time after extirpation and persists for weeks up to the time of the death of the animal. In addition to the glycosuria there are polyuria, great thirst, hunger, and rapid emaciation. In one dog which had fasted forty-eight hours the urine contained from 5 to 6 per cent. of sugar, while another dog, weighing 16 pounds, fed on an exclusive meat diet, eliminated daily almost 1 litre of urine with 6 to 8 per cent. of sugar. When grape-sugar was added to the diet the percentage of sugar in the urine amounted to 13 per cent., the greater part of the sugar being eliminated unchanged. The urine of the dogs thus operated upon also contained considerable acetone, while the percentage of sugar in the blood was greatly increased, amounting in one case to 3 per cent. and in another 3.46 per cent. No glycogen was found in any of the organs after death, even in animals on a full meat diet which had been diabetic for four weeks or more. It is said that there was no injury to the solar plexus in the operation, so that the diabetes is to be regarded as the result of extirpation of the pancreas. Transfusion of blood from a diabetic dog into the veins of healthy animals did not produce excretion of sugar.

in the latter. In these animals, also, absorption of fats and assimilation of proteids was seriously interfered with.

Germain Sée and E. Gley⁸⁴ have repeated the experiments of von Mehring on *phloridzin* as a cause of glycosuria, and with similar results. Daily doses to dogs of from 1 drachm (3.9 grammes) to the kilogramme (2 pounds) of body-weight produced, after the first day, 10 to 12 per cent. of glucose. The glycosuria ceased when the phloridzin was suspended. It is only in its complete form that phloridzin exercises this action on nutrition, as the same dose of phloretin, or any other of its products, will only produce 1 per cent. of glucose in the urine. Whatever diet is administered to the animal, sugar is found in the urine. As all glycogenic substances are rapidly destroyed by phloridzin, it is evident that glucose may be formed in the organism by albuminoid and fatty substances. At the end of a few days the animal became voracious, and wasted rapidly if its diet were not increased.

Seegen¹¹⁴ v.13 p.267 regards the mild form of diabetes of the fleshy as purely of *hepatic origin*, the cells of the liver being only affected. In consequence of an anatomical or chemical change, as yet not known, they have lost their glycogenic power. A large portion of the sugar introduced by the food is no longer utilized, but carried off with the urine. In this form of diabetes diet has great therapeutic effect. The severer form of diabetes, the diabetes of the lean, is, on the other hand, due to a change of all the cells of the organism which have lost the power to utilize the sugar furnished by the blood. Diet, in these cases, is only a palliative.

A lengthy discussion on the *nature of diabetes* took place at the Academy of Medicine of Paris, in the early part of the year, the reports of which are so voluminous that it is difficult to sift them. Albert Robin⁵⁵ June 10 read an exhaustive paper on the physiological pathology and therapeutic indications, the sum of which is that in diabetes there is not only *exaggeration of all the acts of nutrition in general*, but that there is a special *superactivity in certain organs, especially the liver and the nervous system*; that diabetes is essentially characterized by the production of an abnormal amount of sugar through the exaggerated function of the hepatic cells. He then proceeds to detail the result of the action of remedies which he believes sustains this view, namely,

antipyrin, quinine, arsenic, the alkalies, opium and its alkaloids, opium and belladonna, bromide of potassium, all of which diminish tissue-change, and with it sugar formation, in various degrees. Germain Sée, who also claims that normal urine contains sugar, held essentially the same views.

Jules Worms opposed the views of Sée and Robin, claiming that the theory of hyperglycogenesis has not been proved, because the experiments of Robin were made upon diabetic patients highly azoturic and highly glycosuric. His results would, perhaps, be different if he had taken subjects with a little sugar and without azoturia. It is known that, normally, the adult eliminates from 25 to 40 grammes (6 to 10 drachms) of urea in twenty-four hours, also that the diabetic eliminates sometimes more and sometimes less; and if there is a single diabetic in which the co-efficient of nitrogen is less than normal, the entire theory of Robin is liable to fall to the ground. To be received, Robin's observation should be made upon the diabetic when he is not azoturic. Further, it may be asked why the results obtained as to the oxidation of other substances, as sulphur and phosphorus, are any more characteristic of diabetes; and, in the case of phosphorus oxidation, according to Robin himself, they are not always exaggerated, but sometimes diminished. Worms considered that if the theory of Robin is correct clinical observation would be of no value, to which Sée replied that clinical medicine could only advance by the aid of physiology, as Rousseau had always claimed. Robin replied that if Worms had heard his communication with attention he would have noted that he claimed that the diminution of phosphorus oxidation only occurred with the cachectic diabetic,—the albuminuric who had arrived at the last stage of the disease.

Dujardin-Beaumetz presented two objections to the theory of Robin: First, if diabetes is the result of exaggeration of vital acts, how is it that this disease mostly shows itself in persons who have arrived at the decline of life, when nutritive changes begin to grow less? Second, if moderate exercise, as it is generally admitted, is of service in diabetes, how is it reconciled with the theory of Robin? Robin replied that he was aware that diabetes affects more frequently the age of decline, but it was precisely on these facts that his observations were made. As to the second objection, it had been demonstrated that motor muscular movement augmented

neither disassimilation nor oxidation, and that therefore there was no point of difference between him and Dujardin-Beaumetz.

Meyer, of Naples, Italy, corresponding editor, states that Ferraro,⁵³⁷ speaking of the alterations of the organs in diabetes, says that in 8 cases of diabetes studied by him he has always been able to ascertain anatomical alterations, more or less deep, in one or more organs of the digestive system, while he has never been able to ascertain any serious alterations in the nervous system, although the cases he studied were grave and there was a great quantity of sugar in the urine. Therefore, although we cannot combat Bernard's assertion (who maintains that diabetes cannot be characterized by any anatomical alteration), on the other hand, it is certain that we find constant alterations in the digestive system (sometimes in the stomach, pancreas, or liver, etc.); for these and other reasons the author thinks we must conclude that the functional disturbance which we call diabetes *takes its origin from some organ of the digestive system*. Only when this physiological problem has been solved shall we be able to say that we know the mechanism which produces diabetes, and of what importance are those alterations of the stomach and pancreas which are so frequently found in cases of diabetes.

Morbid Anatomy.—P. Ferraro,⁵³⁷ ⁶ in the eighth of his series of investigations into the structural changes in the organs of diabetics, reports that the arteries were affected with *endarteritis*, and that in the *lungs* were morbid changes not due to the bacilli; in the *stomach* and in the intestines the mucous membrane was atrophied, the *pancreas* transformed into a firm, compact mass of cicatricial tissue; while in the parenchyma of the *liver* and spleen there were also signs of atrophy. The *nervous system*, on the other hand, was *not* apparently the seat of any changes.

It will be remembered that Frerichs and Ewald also observed *sclerosis of the vessels* in diabetes, especially when associated with gout. Schüller^{4, 538} calls attention to diabetic gangrene, as observed in the closer study after operation by Griessinger, König, Israel, Zeller and Röse. Cantani ascribed it to the withdrawal of water. Schüller has found the calcification, especially in the muscular coat of the vessels, while he found complete absence of chronic endarteritis in many cases.

The *alterations in the kidney* accompanying diabetes mellitus

have been the subject of recent investigations by R. Fichtner.²⁰ Those heretofore observed have been glycogenic infiltrations of the cells of Henle's tubes, interstitial inflammation leading even to granular kidney and epithelial necrosis, especially in cases of diabetic coma attributable to the action of acetones and diacetic acid. Fatty degeneration is also included in the number having been observed by Frerichs and Ebstein. The latter also finds fat between the cells. Slight degrees of parenchymatous inflammation, manifested by cloudy swelling, are also to be included. In two cases of diabetic coma, the breath having the characteristic odor, where autopsies were made by Fichtner, he found, in addition to glycogenic degeneration, fatty degeneration of the corticle epithelium, with a peculiar regular arrangement of the fatty globules along the periphery of the cells beneath the basement membrane, those tubes being alone affected which contained cloudy epithelium. There was no necrotic or inflammatory change, although one of the cases during life presented albuminuria and renal casts, and would be diagnosed as chronic nephritis. In seeking to account for these changes, he is inclined to ascribe them to the action of acetone and diacetic acid on the renal cells. Should fatty degeneration occur apart from coma, it might be caused by the action of a large amount of sugar on the cells. Nothing is said of the possible *accidental* coincidence of this degeneration with diabetes.

Age—Diabetes Mellitus in Children.—W. J. Scott²²² reports the case of a child of 14 months which had been ailing, at most, five weeks when first seen. The child was thirsty and passed large quantities of urine, specific gravity 1035. The mother and father were healthy, but the sister died of diabetes at 13 years. The child fell out of bed five or six weeks previously, but there were no other symptoms leading to believe the accident responsible. He recalls the fact that out of 618 cases¹⁰⁸¹ only 4 were under 10 years. A. B. McCrea reports¹⁸⁶ the case of a child, aged 17 months, which died after a short illness.

Curt Stern¹⁵⁸ has published an exhaustive article on *diabetes in children*, for which he has collected 117 cases, of which 75 have been published since 1876, and therefore were not used by Külz, who had collected 111 cases. Stern believes that the disease is not nearly so rare in children as has been commonly supposed.

As to *sex*, of the 117 cases 47 were females, 31 males; of the remainder, the sex was not determinable. The proportion of males to females was 5 to 3, a result that approximately agrees with that of other observers. The fact is the more remarkable since it is the reverse of that found in adults, the disease being much more common in men. As to the age itself, he found 6 under 1 year, 1 seeming to be born with it, as it was noted a few days after birth; 7 were over 1 year, 3 over 2 years, 7 over 3 years, 6 over 4 years, 5 over 5 years, 1 over 6 years, 6 over 7 years, and 2 cases had completed 8 years; 8 were 9 years old, 6 were 10 years, 9 were 11 years, 8 were 12 years, 9 were 13 years, 5 were 14 years, 4 were 15 years. Of the remaining 28 the age was not given. The children, as seems to be the case with adults, appeared generally of the better class, and 1 only was put down as a Jew. As to the *etiology*, heredity was conspicuous, since the parents were often diabetic. Of 4 children whose father or mother was diabetic, 2 boys had diabetic fathers, 2 girls had diabetic mothers,—looking as though the disease descended from father to son and mother to daughter. Frequently, where the parents were not diabetic, relatives were. Next to heredity, Stern found previously-existing disease the most frequent cause, notably gastric catarrh. Two cases succeeded a *morbus maculosus Werlhofi*. Diabetes has also been observed following typhoid fever, and transient glycosuria has also succeeded malarial disease, measles, the immoderate eating of saccharine matters, and even fatty substances, as well as indiscriminate eating with daily exposure to wet and cold. The latter alone seems also to be a cause, a cold bath another, and, finally, concussion of the brain from falls or blows. The *symptoms* were as various as those of diabetes in adults.

The *morbid anatomy* furnishes the usual meagre record. Von Jaksch found in a 13-year-old boy an exceedingly hard, tough brain-substance; while Frerichs found in a 12-year-old girl the brain of normal consistence and moderate vascularity, and, in addition, in the left thalamus and the corpus striatum, small red spots, but nothing in the fourth ventricle. Reimer, on the other hand, found in the floor of the fourth ventricle a glioma. Voltolini found in a 3-year-old boy, who presented the phenomena of general anæmia, flabby but pale kidneys. Griessinger found the kidneys greatly enlarged, and penetrated with numerous abscesses. Von

Jaksch found also an atrophied pancreas and enlarged lymph-glands. Frerichs found the lungs hard and moderately vascular, but otherwise normal.

The *duration* in children varies greatly. Out of 34 cases the shortest duration was two days; the longest had not terminated at the end of five years. In 7 cases it did not last one month, and of these 1 was cured. Seventeen lasted less than a year, and of these 7 were cured. Ten lasted over a year, and not one of these recovered, and it may be said that recovery scarcely occurs where the duration is more than one year. It would seem, too, that the smaller the child, the quicker the course of the disease, although this is not without exception. It is interesting to note also that the girl that died after two days illness was 4 years old, while the child born with saccharine urine recovered in eight months.

As to *prognosis*, out of 77 cases traced to their termination, 14 recovered, 7 improved, 4 remained unimproved, and 52 died. In all cases which recovered the quantity of sugar was very large, while treatment was in almost each case very energetic. How many of the cases called "cured" will relapse is, of course, unknown. On the whole, however, the prognosis in the case of children is bad, fully three-fourths dying.

The *treatment* of greatest value here, as well as in adults, is the dietetic, although the difficulties in carrying it out in the case of children are naturally great. Next in efficacy seems to be diet in combination with the bath cure, as at Neuenahr, Carlsbad, and Vichy. Of drugs, the alkalies, in the shape of bicarbonates, seem to be those which were followed by the best results, although none are specifically curative. Dudley P. Allen⁵¹ reports 2 cases of diabetes in children, 1 in a boy aged 3 years and 8 months, with no hereditary tendency to the disease. The first symptoms were observed in June, and he died on January 10th following, treatment having had very little effect. The second case was a boy aged 7, in whom there was a decided hereditary tendency, one great-uncle and two great-aunts having died of diabetes at from 40 to 45 years of age. Without other apparent cause he began to ail early in June. He improved considerably under treatment by iron and opium up to September 1st, but died in October.

Co-existence of Diabetes in Husband and Wife.—Debove,²⁵ at a meeting of the Société Médicale des Hôpitaux of Paris, read a com-

munication on the comparative frequency of diabetes in husband and wife at the same time. In a series of 30 cases under his observation this had occurred five times. Similar coincidents had been noted by Lecorché, who thought it might be explained by similarity of diet or by sharing a common anxiety, and by Rendu, Gaucher, Letulle, Labbé, Dreyfous, and others. Debove himself suggested contagion, but admitted the necessity of more observations. R. Tilley⁸² had also met 2 cases. In the course of a life-insurance investigation, sugar was found in the urine of an applicant. His wife consulted a physician on the subject, and asked to have her urine examined, when, to his surprise, he found sugar in it. Precautions to obtain the two urines separate confirmed the first results.

Symptomatology—Carbonic Acid Exhalation.—Livierato, of Genoa, ²⁷³_{B.24,p.16} in a series of experiments upon 3 confirmed diabetics, each secreting about 500 grammes (16 ounces) of sugar in twenty-four hours, ascertained that on an ordinary diet the excretion of carbonic acid is diminished more than one-half. In a mixed diet, with starch excluded, but consisting of meat, milk, cheese, and vegetables, the excretion of carbonic acid increased somewhat, but did not reach the normal amount, while the excretion of sugar was markedly diminished. On an exclusive meat diet the obese diabetic gained weight, as did the leanest of the other two. In the third excretion of sugar was markedly diminished, and there was increased excretion of carbonic acid. In the thinner patient there was increased emaciation and diminution of sugar and stationary excretion of carbonic acid. Under the same diet and with the use of sodium carbonate there was increased weight in the patient, diminished excretion of sugar, and considerable increase of carbonic acid, which was above the normal in 1 patient. The addition of milk to the meat always increased the amount of sugar and diminished the carbonic acid excreted.

Loss of the Tendon Reflex.—Nivière²¹² adds to some interesting points in connection with this symptom to which attention was first called by Bouchard. He first remarks that it may be overlooked and that search for this symptom may give negative results unless care be taken to pursue the method pointed out by Jendrassik, consisting, in delicate cases, in making a muscular effort in another region of the body during the examination of the reflex. For example, when percussing the patellar tendon, the patient

should join the fingers of the left hand with those of the right, extending them in front of him and drawing upon them as strongly as possible. A reflex can thus sometimes be discovered, when by ordinary measures it will escape notice.

The examination of the statistics by Nivière has shown that 89 out of 210 diabetics, or a little more than 43 per cent., present either a total loss or a notable depression of the tendon reflex. A remarkable fact is that the period of occurrence of this symptom is not stationary, being observed at times when aggravation of the disease occurs, at others when the patient is improving.

The diagnostic value of the loss of the reflex, though important, is not absolute, for it is demonstrated that this loss exists in healthy subjects in the proportion of 1.5 per cent. Again, it occurs in many groups of affections of the nervous system. It is really more important in connection with prognosis. The French authors are unanimous in admitting that the loss of the tendon reflex is a grave prognostic symptom. From a surgical point of view, for example, operation should be avoided in patients presenting this symptom, it having been found that in diabetics who lost this reflex death supervened in 35 per cent., while in those who retained it the mortality was only 5 per cent.

Prognosis.—Jules Worms ³_{May 15} reported to the Academy of Medicine of Paris the course of the cases of diabetes under his care during the previous year. The number was 44, of which 5 died of pulmonary consumption, 2 of pneumonia, 1 of hepatic cancer, 2 of nephritis complicated in 1 case with diabetic coma, 2 of cerebral haemorrhage,—in all, 12. Death supervened after the first determination of glycosuria in 3 instances at the age of 12 years, in 4 from 12 to 19 years, 3 at 11 years, 1 at 7 years, and 1 in an infant of 2 years. Among the 29 still living the majority have been glycosuric for a time varying from ten to twenty years. He does not believe that diabetes can be explained by any single theory,—that a distinction between glycosuria and saccharine diabetes is not justified. He has seen diabetic coma terminate in recovery, and observed the curious fact of the appearance of coma coincident with the sudden disappearance of sugar, return of the latter in liberal quantity coinciding with the disappearance of acetone. He found in daily analyses considerable variation in the quantity of sugar in the same patient and on the same diet.

Lipæmia.—Joseph Coats^{213 Aug} reports 2 cases of diabetes associated with lipæmia, both being in young girls. In Maggie J. the illness began sixteen months before death, with excessive hunger and thirst and frequent micturition. The quantity of urine was more than 300 ounces (9331 grammes) in twenty-four hours, and the specific gravity 1030; there was no albumen until three weeks before death, when a trace appeared. At the autopsy, on removing the sternum, it was at once observed that the veins frequently contained a whitish and fatty-looking material. The superficial veins of the heart were also seen to be injected with white matter. The right auricle was occupied with an opaque, white coagulum, which had not the gelatinous appearance of ordinary post-mortem clot, but a white, milky appearance suggesting fat. Throughout the body the veins contained white coagula, and when this was not the case the blood had an opaque, brown appearance. The intestinal veins showed white coagula in a very striking manner, and it was noticed that while those close to the intestine and on its surface were occupied with white matter which looked like cream, these usually diminished in passing up the mesentery, the white matter becoming mixed with ordinary blood. The veins of the leg had similar characters. The white matter was found to consist of finely-divided oil, which was present in the blood in every part.

The second girl, Jennie M., was 14 years old, and had been ill nine months. The disease was ascribed by the parents to over-work at school. At the autopsy, on removing the dura mater, the cerebrum was seen to be bathed with a milky fluid. The pericardium contained the same fluid. Throughout the body the blood had a pinkish, strawberry-and-cream appearance. On microscopic examination, in all the organs of the body the blood was found mixed with fat, usually in a state of extreme subdivision, visible as a finely-granular mass, more distinct in osmic-acid preparations, in which the blood had a black color.

Diabetic Coma.—E. Stadelmann^{69 Nov. 14} has continued during the last year his observations on diabetic coma, clinically and experimentally, and publishes the following conclusions: 1. Diabetic coma is to be distinguished from accidental coma, due to other causes, by occurring only in diabetics in whom oxybutyric acid can be demonstrated in the urine. 2. Of almost equal value to the presence of oxybutyric acid is ammonia, the determination of

which in the urine is much more easy. 3. Diabetics with more than 1.1 per cent. of ammonia excretion are in danger of becoming grave diabetics. 4. Diabetics who have an ammonia secretion of 2, 4, 6 or more grammes (30, 61, 92 grains) in twenty-four hours require careful watching by the physician, since they are in danger of diabetic coma. 5. If the determination of oxybutyric acid or the quantity of ammonia is not possible, then the chloride-of-iron test, at least, should be made. If the latter responds, then oxybutyric acid is present, and the patient passes into category 3 and 4. The reverse, however, is not necessarily the case, since there are instances in which oxybutyric acid is present, and even diabetic coma occurs where the chloride-of-iron reaction will not take place. 6. Cases in which oxybutyric acid or the chloride of iron best respond, or the ammonia is increased, should be placed only with the simultaneous exhibition of full doses of alkalies and with the greatest caution on a pure flesh diet. 7. If there is reason to suspect an outbreak of diabetic coma, alkalies should be given in larger doses, carefully watching the patient, and with appropriate intermissions. 8. Should diabetic coma occur, intravenous injections of sodium carbonate in physiological salt solution (1 to 1.5 per cent. in a 7 to 10 per cent. solution), watching the patient. The injection is discontinued if irregularity or great slowing of the pulse, convulsions, or cessation of breathing occur. The infusion is to be repeated, after a time, until the urine becomes alkaline. 9. Subcutaneous injection of sodium carbonate is to be avoided, these being painful and apt to produce abscesses.

Stadelmann also calls attention to the similarity between the coma of diabetes and the condition produced in herbivorous animals by inducing acid intoxication, and to Minkowski's analysis of the gaseous contents of the blood. In the normal condition the blood of the rabbit contains 25 per cent. of carbonic acid, but when the animal is suffering from acid intoxication the carbonic acid is diminished. Thus, in one instance, Minkowski found 16.4 per cent. with a moderate degree of intoxication; when the latter was increased the percentage of carbonic acid fell further, first from 8.8 per cent., and finally to 2.9 per cent. In order to compare this with the gaseous change in the blood of diabetics, he examined the blood of a patient before and during coma, and found the carbonic acid, respectively, 17 per cent. and 3.34 per cent. In order

to ascertain whether this diminution of carbonic acid in the blood was merely due to coma as such, without reference to its cause, he examined the blood of a comatose patient, not diabetic, whose condition was due to meningitis. In him he found the carbonic acid 28.2 per cent. He continues to hold his original view that the acid in the blood is oxybutyric, and says that in some cases it appears in the urine to the extent of 3 ounces (93 grammes) *per diem*. Some years ago Stadelmann found a new acid in considerable quantity in certain cases which he believes to be crotonic, arising from oxybutyric acid, which Minkowski and Küly, independently of each other, originally pointed out as the intoxicating acid of diabetic coma, and which is very readily converted into crotonic acid by chemical manipulation.

Diabetic Gangrene and its Causes.—Max Schüller^{4,53} is of the opinion that diabetic gangrene is caused partly by the fact that diabetes predisposes to arterial sclerosis and partly owing to the fact that in such persons the condition of nutrition is such that the origin of inflammations and their extension, especially infectious inflammations, is often favored by insignificant lesions.

T. G. Morton⁶² thinks diabetic gangrene not nearly so rare as most surgeons suppose. He himself has had 14 cases in his own practice. He obtained from the records of the Pennsylvania State Hospital for the Insane, at Norristown, the fact that, out of 20,000 cases of pauper insanity, there was not a single case of gangrene among the diabetics, although he does not say how many diabetics there were altogether. He concludes, therefore, that it is extremely rare among the poor. This, it is well known, is true of diabetes itself.

Lesions of Organs of Vision.—Stoever⁶¹ thus enumerates the lesions of the organs of vision produced by diabetes: 1. Anomalies of accommodation and refraction. 2. Cataract. 3. Troubles and haemorrhages of the vitreous body. 4. Hæmorrhagic retinitis. 5. Atrophy of the optic nerve. 6. Paresis of extrinsic muscles of the eye. 7. Keratitis, more or less grave.

Pneumonia.—Seegen¹¹⁴_{v.18,p.267} refers to a special fibrous pneumonia, before described by Riegel. Fink reports a case³⁴ in a man 32 years old, who had diabetes mellitus for three years, in whom, three months before death, sclerosis of the right lung was diagnosed, with dilatation and purulent secretion of the bronchi. No

bacilli were found in the sputum. The autopsy confirmed the diagnosis, and the sclerosed tissues contained neither bacilli nor tubercle nodules.

Tumors.—Tuffier² has called attention to the not infrequent coincidence of diabetes and neoplasms. Almost every form of tumor has been observed in diabetic patients, and almost every form of diabetes has been found to attack persons who already have tumors. As a rule, the constitutional disease comes first, the patient being diabetic before the tumor makes its appearance. Malignant tumors, as a rule, advance in these cases without causing much pain, and somewhat slowly, but they proceed more rapidly than the diabetic symptoms. They are apt to be mistaken for innocent growths. The application is important in connection with operative interference, and no surgeon should think of removing small, innocent growths which are causing no trouble. In illustration of this, Tuffier relates that in one case death occurred forty hours after the removal of a small parotid tumor, the fact that the patient had diabetes being overlooked. Again, a little hypertrophic tumor of the cheek was removed at the patient's request; phlegmonous erysipelas set in, followed by sloughing, killing the patient in five days. Here, too, the presence of diabetes was overlooked. When an operation is absolutely necessary it is important to spend some time in reducing the diabetic symptoms by treatment. Should, however, all the sugar and polyuria have disappeared, the surgeon must still never overlook the patient's diathesis. Under the most favorable circumstances, in any case of the kind, deep operations and prolonged dissections, free division of vessels, and formation of large flaps are to be avoided. The slow progress of tumors and the little pain attached are significant facts. Tuffier has found malignant growths lie almost latent in diabetic subjects for long periods, so that removal of similar growths from a healthy subject would scarcely insure him against so long an interval before recurrence. The thermo-cautery is to be preferred to the knife. No traction of skin-flaps is to be permitted. The wound must be treated with extreme antiseptic precautions.

TREATMENT.

Dietetic Treatment.—The paper of Charles Harrington,⁹⁹ Mar. 22, '98 freely quoted in the ANNUAL for last year, which exposed the

fraudulent character of the prevailing diabetic foods, has had a good effect in stimulating the effort to secure purer flours. John A. Jeffries ^{Jan. 24} showed to the Section on Clinical Medicine, Pathology, and Hygiene of the Massachusetts Medical Society two samples of bread which are a great improvement over any heretofore obtainable in this country. The first sample, an improvement on those previously in use, easily procured and inexpensive, is made from equal parts of bran and Graham flour as follows: One cup of Graham flour, 1 cup of best bran previously scalded, 1 cup of boiling water, 2 eggs, German yeast or baking-powder, salt to taste, and 1 cup of milk or water. To be mixed *with a spoon*. Such bread contains 17.72 per cent. of starch, the equivalent of 19.68 per cent. of sugar.

The second bread is made of the gluten from the starch factories, ground to a fine flour, to be obtained from Theodore Metcalf & Co., 37 Tremont Street, Boston, Mass. It is made as follows: One cup of gluten-flour, 1 cup of best bran previously scalded, 1 teaspoonful of baking-powder, salt to taste, 2 eggs, 1 cup of milk or water. To be mixed *with a spoon*. If hands are used in mixing, the result will be even more disastrous than by employing ordinary bread. This bread is healthy, nutritious, and, according to Jeffries, palatable, and contains but $4\frac{1}{2}$ per cent. of starch, the equivalent of 5.08 per cent. of sugar. My own experience does not altogether accord with that of Jeffries as to the palatableness of this bread, the only 3 patients with whom I attempted to use it having declared that it was absolutely impossible to eat it. The first variety of bread made with the bran and Graham flour is not objected to. Jeffries says he believes that the second variety is practically the same as that described by Woltering, ²⁹⁷ _{Aug. 4, '88} published in the ANNUAL for 1889.

Arnold Pollatschek, ⁸⁴ _{May 11 et seq.} in an exhaustive article on diet in diabetes mellitus, concludes that wines containing more than $2\frac{1}{2}$ per cent. of sugar should not be permitted unless the sugar be levulose. Brandy and wine of purity may be used by the diabetic in small quantities. Beers which contain from 5 to 7 per cent. of extract which contains 80 per cent. of carbohydrates, and at times 1 to 3 per cent. of sugar, should be permitted in moderate quantities only. The diuretic action of beer, which is three times as great as that of water, must also be taken into consideration.

Soya Bread.—The *Soya hispida* is a leguminous plant growing in Japan and the far East, but recently cultivated in Austria and Hungary, the grain of which is used by the natives in the preparation of sauces and to make a sort of vegetable juice. It contains a large proportion of fat, which takes the place, in great measure, of the starches in other grains. Blonchel says it contains only an infinitesimal trace of starch. Lecerf²⁴ and Dujardin-Beaumetz recommend a bread made of it for diabetics. The bread resembles rye-bread, has an agreeable taste, and is quite digestible. It has a tendency at first to cause diarrhoea.

Bread from the Embryo of Corn.—G. Pouchet²⁵ describes a new food for diabetics, highly nutritious and containing no starch. It is made from the embryo of corn. Danype, the originator of this new bread, has succeeded in separating the embryo from its farinaceous endosperm and of all oil and other substances calculated to injure its flavor. From the embryos a flour is made. The bread is easily digested and said to be agreeable. In some of the hospitals of Paris it has been introduced for the use of diabetic patients.

Position of Saccharin as a Nutrient.—At the request of a board of Belgian manufacturers and refiners of sugar, the Minister of the Interior of the Belgian Government transmitted to the Royal Academy of Belgium a request for a report on the nature of this substance. On the 28th of July the Academy appointed a commission of five for the purpose, which subsequently reported through its secretary, Bruylants.⁵² The conclusions were as follow: 1. Saccharin is not toxic, having been taken with immunity in large doses. 2. Saccharin is excreted in the urine, although it does not all appear thus; and, while of the remainder there is reason to believe that some is discharged with the urine and some in the breath, there is still reason to believe that a small quantity undergoes decomposition; but what are the products of decomposition or what is their action is not known. 3. Saccharin in very large doses sometimes appears in other secretions than the urine, as, for example, in the milk. 4. Saccharin possesses antifermentative properties. Thus, a mixture of equal parts of a .32-per-cent. solution of saccharin and of urine, left to itself at a temperature of 16° to 17° C. (60.8° to 62.6° F.), ammoniacal fermentation was retarded seven days, while a mixture containing the same proportion

of salicylic acid was in full fermentation. A $\frac{1}{2}$ -per-cent. solution completely arrests fermentation, while, in the proportion of 2 parts in a 1000, pepsin and diastatic digestion are retarded. 5. Saccharin is not an element, and cannot replace a true elementary substance as sugar, any more than vaselin can substitute butter on account of its unctuousness, or a colored liquid substitute wine on account of its color; while it dare not be said that its use in food and drink is altogether without disadvantage to the consumer. Finally, those who use it in making preparations should be compelled to inform the consumer of them that it has been used.

General Management.—Charles W. Purdy²³¹ says the basis of all treatment is dietetic. He treats almond-flour at some length, and gives a reason for its not being in the market is that the large percentage of oil, 50 per cent., renders it unfit for keeping sufficiently long for commercial purposes. The meal should therefore be made as required. Almond-flour when beaten up with eggs may be raised with the aid of a little baking-powder and baked in small tins in the oven, and the bread is regarded by most as equally palatable with ordinary bread, but, like all substitutes for bread, it should be used in moderation, lest the patient should become tired of it. Purdy says of milk that it is successful only in the milder forms of diabetes of reflex origin, which are controlled by moderate limitations of diet. In more severe types of the disease he has found that when the diet was rigidly restricted, save in the use of milk, the total exclusion of this article without other change caused a prompt reduction in the amount of sugar, and even its total disappearance. He says that the lactine, of which the milk contains about $\frac{1}{2}$ ounce (15 grammes) to the pint (500 grammes), comports itself precisely as does grape-sugar, and that in the more pronounced type of diabetes requiring strict diet milk should be excluded from the list. On the other hand, the form of glycosuria which occurs in obese and overnourished persons, in whom the amount of sugar is usually small and probably largely due to the indigestion of more hydrocarbon than the system is able to appropriate, is benefited and even cured. The milk cure, consisting in the exclusive use of skimmed milk, is likely to benefit such persons, because it is, in fact, a system of starving; while, in diabetes of central origin, where the assimilative powers of the system

are weakened and more or less emaciation has set in, it is unwise to confine a patient to an absolute milk diet, for in such cases death by inanition must come sooner or later, at any rate.

Dujardin-Beaumetz,²⁶ in his regimen for diabetics, is said to prohibit milk, but allows 100 grammes (3½ ounces) of boiled potatoes at each meal. He prohibits brown bread, fatty foods, and pork meats. Beverages are sweetened with saccharin; the maximum daily dose is 10 centigrammes (1½ grains). Tea and coffee are substituted for alkalies. To this regimen he adds, in the way of medicine, bromide of potassium, antipyrin, and he regards muscular exercise as of great value.

In the paper already largely quoted, Cantani says that he is convinced that no medicament exerts true beneficial influence in diabetes. Opium may through its narcotic properties diminish thirst, but it hastens deterioration of the digestive function and therewith diabetic marasmus and death. Saccharin may satisfy the taste of the individual, but cannot take the place of the carbohydrates in tissue-change. Salicylic acid, phenol, and thymol have no active effect on diabetic glycosuria or upon the general condition of the patient, in his experience. The same is true of arsenic, iodoform, and iodine. The ammonium salts, quinine, pilocarpine, digitalis, the bromine salts, lactic acid, and the lactic-acid salts, which he prescribes in certain cases, serve as a means of aiding digestion. There are, however, no cures of diabetes, and acids are in general harmful. The alkaline compounds he has often found of great use, partly on account of the favorable effect of the alkalies and partly because they furnish, in the shape of lactic acid, oxidizable material which substitutes the sugar which will not burn; but the acid is at best an unsatisfactory substitute. Alkalies may, to a certain extent, be useful in helping the antidiabetic diet; by their use less rigorous dietetic methods are rendered possible, and a useful purpose is thus served by numerous mineral waters, such as those of Carlsbad, Vichy, Fels, and Neuenahr. He is in the habit, therefore, of using in his treatment the alkalies, carbonates, and sulphates, as well as the mineral waters, especially those of Carlsbad, the wholesome surroundings of which are useful and advantageous.

His sheet-anchor of treatment is the exclusive use of albuminous and fatty foods for a long time, followed by a gradual return

to a mixed food. His reasons therefor are the following: 1. It is a fact that in the diabetic a certain stage is reached in which the carbohydrates are absolutely useless, because they are not oxidized. Indeed, the sugar soon becomes a poison to the diabetic, for it only increases the glycaemia, which is the first cause of the polyuria, and which has, as a further consequence, the drying up of the organism with its pernicious effects, viz., the cloudiness of the crystalline lens, the extreme thirst, and further irritative effects which develop in certain organs, such as nephritis, diffuse arterial sclerosis, etc. 2. He is convinced that the constitutional tendency of the individual to the misappropriation of starchy and saccharine articles furnishes the most important cause of diabetes, since the assimilative power of the organism for this substance increases more and more. It is, therefore, only by an absolute and continued rest of the organs concerned with the digestion and assimilation of carbohydrates that their powers can be restored, provided that their exhaustion be not complete.

Cantani's course of treatment is thus laid down by him, subject, however, to certain modifications in individual cases:—

For the period of three months an exclusive meat diet is prescribed, including the flesh of any animal prepared in any way, provided forbidden articles are excluded, as fish, including also such as are preserved dry, viz., anchovies, herring, sardines, tunny, cod-fish, or salmon, and the like; crustacea and other so-called products of the sea; eggs, bouillon, the viscera of animals (especially recommending pancreas, but excluding liver); boiled ham, pancreaticized animal fats (especially lard, but also butter) and oils, with salt as a condiment, and occasionally pepper; black coffee and black tea without a grain of sugar; in the place of wine, rectified alcohol, with carbonated water, with fennel-, anise-, balm-mint-, peppermint-, cinnamon-, and orange-flower water, as the patient may prefer; instead of vinegar, if none can be had entirely free of glucose, citric acid in water, but always in minimum quantity, as much only as is necessary to give savor to the food and satisfy the taste.

Absolutely prohibited are all flours and every sort of sugar, all fruits, milk and milk foods, brandy and rum, which always contain sugar; finally, also green vegetables.

Generally, he begins in the fourth month a gradual return to

a mixed diet. In accordance with the requirements of each case he extends the diet from day to day, sometimes increasing the interval. In the majority of cases, where the disease has not advanced too far, in which sugar has not persisted too long in the urine, during the fourth month he permits green vegetables, walnuts, hazel-nuts, almonds, pinole, and olives; in the fifth month, old cheese, also fresh-milk foods and milk; in the sixth, old acid wines, fruits (not too sweet); and in the seventh month, flour-made foods, but of these sparingly through life, and never permitting cane-sugar or fruits containing much sugar, such as dates and figs.

This diet excludes, as far as possible, for some months, all carbohydrates. It is true that even muscle, eggs, and the products of the sea contain sugar, but it is in the smallest quantity, and the more permissible since the animal sugars are more easily assimilated and oxidized by the diabetic than milk-sugar and sugar of vegetable origin, as comparative observation with the so-called amylicorous diabetic and those who have reached the so-called carnivorous stage has shown.

In certain cases absolute fasting for twenty-four hours is of service, especially where the patient is found on the boundary between the amylicorous and carnivorous stage, and, later, at the beginning of the second stage, where sugar appears in the urine, even on an absolute meat diet.

Cantani believes that experience sustains his theoretic views. He can recall many true diabetics who, after prolonged treatment, have been living since 1870 upon the mixed diet without a trace of sugar, and acquired their previous strength and good appetite. Among these he includes cases of severe mental strain which, in consequence of continued operation of the cause and excessive consumption of starch and sugars, relapsed, and then recovered upon the strict diabetic diet; and, although every diabetic may not respond to treatment as one may desire, it is to be remembered that not every syphilitic can be cured by mercury and not every case of malaria by quinine. On the other hand, Cantani is not in the habit of treating with rigid diet the cases of glycosuria which are due to some nervous lesion which is rapid in its course. These cases, which he calls neurogenous diabetes, he does not regard with the same pathological significance as constitutional or chylogenous

diabetes. But where the nervous lesion is chronic and of slow occurrence, then it is worth while to combat the diabetes with the aid of antidiabetic diet, in order that the patient's general condition can be kept up. But, even in these cases, when he finds it impossible to remove the sugar from the urine by a strict diet, he is in the habit of allowing a moderate amount of carbohydrates.

Treatment by Gymnastics.—Aye⁴ reports 3 cases of diabetes greatly benefited by gymnastics. He says it may not be equal to walking or mountain-climbing, but it has the advantage of being more evenly graduated than either of these, while it is available in all kinds of weather.

Medicinal Treatment.—Undoubtedly the remedy for diabetes mellitus which has attracted the most attention in the past year, and for which the most satisfactory results have been claimed, especially by the French school of physicians, is *antipyrin*. Among the very first to use it was J. E. Kibbe, of Louisiana, U. S. A., who was called in July, 1887, to see a woman 50 years old, weighing at least 225 pounds, who, for fifteen years, had suffered excessive thirst, as much as 3 gallons of water being consumed in a single night and a proportionate amount during the day. She passed also an enormous quantity of urine, of which the specific gravity, taken once, was 1008. She had consulted numerous physicians and visited various springs without avail. Kibbe was not consulted for the polyuria, but on account of continued fever, which he considered typho-malarial. Finding her with a temperature of 105 degrees, he ordered 30 grains (1.9 grammes) of antipyrin to be given every four to six hours. The next morning, after three doses of antipyrin, her temperature was 101 degrees, and her husband informed him that a strange thing had occurred since the previous evening. She had not called for water during the night, and passed urine only once in normal quantity. He continued the antipyrin in two 10-grain (0.6 grammes) doses daily, and, up to the time of her death, six weeks after he was called, there was not the slightest return of diabetic symptoms.

In the same year D. Gonner²¹⁴ called attention to antipyrin as a remedy for diabetes. Since then it has received numerous trials, especially, as already stated, at the hands of Huchard, A. Robin, Dujardin-Beaumetz, Germain Sée, Panas, and others. If the experience of these observers be received, it must be said of

antipyrin that, excepting opium, it is the only drug to which a direct and efficient controlling power over glycosuria can be ascribed. Its precise position as a therapeutic measure cannot be regarded as determined; but the following summary⁹ _{Sept. 2} is probably nearly correct: 1. It is the milder forms of the diseases in which it has been found most efficient. 2. It is administered either alone or in combination with sodium bicarbonate, the latter being preferred by Robin. Fifteen grains (1 gramm) of antipyrin, combined with twice as much of the alkali, are given three or four times a day, an hour before or after meals, and this is kept up from eight to twelve days. Then the treatment is suspended, in order to avoid albuminuria and other toxic effects which excessive administration of antipyrin may produce. This period of intermission is continued until the sugar again returns or increases,—say, for a week. While the patient is taking the antipyrin a moderate amount of starchy food, even potatoes and bread, it is said, may be taken, to be discontinued again during the intermission, and thus the craving for these foods is supplied. The antipyrin alone is used in the same manner. In the hands of Panas⁷³ _{Apr. 13} so small a quantity as 45 grains (3 grammes) caused the disappearance of sugar in 1 case, although it immediately returned when the dose was diminished or the administration ceased. 3. A fact generally acknowledged by those who have had experience with antipyrin is that it is in no sense a cure for diabetes,—simply averting, during its use, the miscarriage of an important variety of food, the hydrocarbons, and thus conserving the energies of the patient. 4. Antipyrin should be cautiously used in cases of nephritis on account of its well-known tendency, in large doses, to produce albuminuria, although its use should not be altogether interdicted on this account. Whenever, however, in non-albuminuric cases, albumen appears in the urine, it should be discontinued, as it should, also, so soon as it is found to produce no effect upon the sugar. It is of doubtful efficacy, also, where tuberculosis has occurred in the course of the diabetes, and where, although it diminishes the sugar, the specific gravity of the urine nevertheless increases; also in cases where the sugar exceeds 3 or 5 ounces (93 to 155 grammes) per quart (1 litre).

A further contribution to the action of antipyrin is found in the experiments of Germain Sée and M. E. Gley,¹⁵² _{Jan. 22} who pro-

duced typical diabetes artificially in dogs by irritating the central portion of the vagus and then administering various drugs with a view to judging of their action, and obtaining further information of the nature of glycosuria thus produced. Bicarbonate of sodium had no effect; bromide of potassium produced slight diminution of the glucose, but antipyrin produced very positive results, reducing the glucose in dogs as much as 2 grammes (30.9 grains) in twenty-four hours. Bearing in mind the general action of antipyrin in diminishing the irritability of the nervous system, these observers ask whether diabetes is not produced by some nervous deviation of nutrition, and more by an exaggeration than by its slackening. Lépine and Porteret, of Lyons, had previously demonstrated that antipyrin slackens the transformation of the glycogen of the muscles and liver into glucose. It is claimed that similar good effects of antipyrin are obtained in the polyuria of diabetes insipidus. In fact, the case of Kibbe, already quoted, was most likely one of diabetes insipidus.

Thomas R. Frazer, ² after careful observation and trial, concludes that the evidence seems to indicate that *codeine* is less powerful in diabetes than either *morphine* or *opium*, and that it may be regarded in its therapeutic positions as a weak or dilute morphine.

Dujardin-Beaumetz, ⁶⁷ _{Mar. 30} reporting recent advances in the treatment of diabetes, says the most noteworthy is that by *arseniated lithia*, which, though it may not have realized the anticipations of its introducer, Martineau, is nevertheless of service, especially in arthritic cases. Dujardin-Beaumetz's method is to give 8 grains (0.5 gramme) of lithium carbonate in a glass of Vichy, to which 2 drops of *Fowler's solution* are added before each meal. In diabetes of nervous origin characterized by extreme polyuria, he gives 10-grain (0.7 gramme) doses of antipyrin, sweetened with saccharin, three or four times daily. Its effect is to reduce the quantity of urine eliminated as well as the sugar, the latter not only *pari passu*, but absolutely. *Phenacetin* and *exulgin* produce about the same results. He recommends saccharin for sweetening, and says, provided the quantity ingested does not exceed 2 grains (0.1 gramme) daily, no inconvenience is likely to result. As to diet, he speaks highly of *soya bread*, the only drawbacks to its use being its disagreeable taste and laxative effect upon the bowels. By

others soya bread is regarded as *not* disagreeable in taste. With regard to potatoes, which have lately been recommended by some of the French school, he says that, as they contain only 17 per cent. of glucose as compared with 19 to 20 per cent. in the best gluten, they are preferable to the latter. He restricts the quantity to 1000 grammes (7 ounces) daily; otherwise the bread will do more harm than good. He says that milk augments considerably the proportion of sugar in the urine, and the same is true of fruits, particularly grapes. To make up for the loss of carbohydrates, fats and viands containing fats are recommended; also cauliflower and sauerkraut. Alcohol is to be permitted in limited quantities.

In the report of his practice in diabetes to the Academy of Medicine, Jules Worms³¹⁵ says it is most important to maintain the vital energy and integrity of the digestive functions; that, while it is desirable, in the main, to maintain strictness of diet, it is necessary at times to diminish this rigor, even to the permitting of a little bread. He has ceased to use saccharin as a sweetener, since he has found it disagrees with digestion. As to drugs, he has found the best results from the long-continued use of *quinine*, 20 to 30 centigrammes (3 to 5 grains), not as a specific, but as a powerful nerve tonic. He also employs *arsenic* and *opium*, but has nothing to say of *antipyrin*, so favorably regarded by his French *confrères*.

Jambul seems rather to be growing in favor in the treatment of diabetes. Gräser³¹⁹ has made some experimental observations on this drug which seem quite conclusive in their results. Making use of the well-known fact that phloridzin produces glycosuria in dogs, he found that 1 gramme (15 grains) of this substance per kilogramme (2 pounds) of body-weight, in a young dog, caused the urine to be saccharine for from twenty-four to thirty hours, 5.89 to 12.45 grammes (77 to 185 grains) of sugar being excreted. If he gave extract of *jambul*, the quantity of sugar decreased 80 to 90 per cent. and the duration of the sugar excretion was shortened. Since, in one of the dogs, nearly .9 per cent. of the sugar was made to disappear by *jambul*, he concludes that by its proper use sugar might be completely banished from the urine. In one of the experiments, of which he gives details, he administered a single dose of phloridzin, followed in two hours by *jambul* extract.

In two others the phloridzin and jambul were given alternately several times, at intervals from one to four hours. From 6 to 18 grammes (92.6 to 277.8 grains) of jambul extract were given to the dogs daily, but even the largest dose produced no evil effects. The jambul extract was obtained from the fruit or seeds received from the Apothecary Society of London.

Valentine⁶ has treated 2 cases with excellent results with *creasote* internally. In 1 case 4 drops were given *per diem*, afterward increased to 10. Under this treatment the sugar disappeared, and did not return when the patient began to eat starchy food. The other cases received 6 drops *per diem* and did equally well.

Thomas Oliver⁶ reports the case of an adult, aged 43, whom he treated with *cocaine*, in doses of $\frac{1}{4}$ grain (0.0162 gramme) three times a day. He had only taken the cocaine a few days when constipation, which was one of his most troublesome symptoms, disappeared; also certain peculiarities of gait, not unlike those of ataxia, and a sense of muscular fatigue. To the return to health and strength were added a gain in weight, a marked diminution in the amount of urine, a decided reduction in its specific gravity, and a fall in the daily quantity of sugar. The temperature, however, remained lowered.

Glycerin is one of the remedies whose position is a mooted question in the treatment of diabetes, being recommended by one and disparaged by another. Most recently, Ransom,¹⁷⁸ after some apparently careful experiments with its use by the bowel, comes to the conclusion that it has certain valuable properties which make it useful in this disease. With regard to its use hypodermically, which has been recommended, he says that administered in this manner it must reach the liver so slowly and in such diffused state as to be almost powerless. He concludes as follows: 1. Certain forms of glycosuria may be checked by glycerin. 2. Glycerin acts more efficiently when introduced into the alimentary canal than when injected subcutaneously. 3. Glycerin checks glycosuria by inhibiting the formation of sugar in the liver. 4. By these means it increased the quantity of glycogen found in the liver.

Treatment of Diabetic Coma.—Stadelmann,⁶⁹ carrying out his views that diabetic coma is due to the presence of oxybutyric acid in the blood, says the indications for treatment are to combat the

acid by large quantities of alkali. He refers to previous attempts to treat diabetic coma on this principle by injecting into the veins a 3- to 4-per-cent. *sodium carbonate* dissolved in physiological chloride-of-sodium solution (7 per cent.),³²⁶ in one instance only of which did it prove successful. He says that if it is not done early no good result can be expected; the urine in twelve hours after the injection is intensely acid. He therefore suggests that it should be used as preventive treatment by administering internally alkaline solutions, as, for example, tartrate or citrate of sodium dissolved in carbonated water, two or three times a day, and he has reason to be satisfied with the results. Appended are some of his formulæ: Citric acid, 8 grammes (123 grains); sodium carbonate, 18 grammes (278 grains); saccharin, 0.1 to 0.2 gramme (1.5 to 3 grains); distilled or carbonated water, 150 grammes (4 ounces 6 drachms); essence of peppermint, 3 drops: to be given three times in twenty-four hours. Again: Tartrate of sodium, 30 grammes (1 ounce); water saturated with carbonic acid, 200 to 300 grammes (6 ounces 3 drachms to 9 ounces 5 drachms); saccharin, 0.2 to 0.3 gramme (3 to 4½ grains); essence of lemon, 5½ drops: to be used one to three times a day. Third: Acetate of sodium, 10 grammes (2½ drachms); carbonated water, 90 grammes (2 ounces 7 drachms); saccharin, 0.1 gramme (1½ grains); essence of lemon, 2.5 drops: three to four times a day. More recently⁶⁹ Nov. 14 he formulates the conclusion found on page 15, which see also as part of treatment.

Von Ziemssen,³⁴ in his paper read before the Munich Medical Society, reported that he had made a trial, in 2 cases of diabetic coma, of large doses of *sodium carbonate*, as recommended by Stadelmann, to counteract the oxybutyric acid, once by the stomach and once by subcutaneous injection. In the first case there was no effect whatever. In the second there was temporary improvement of the general symptoms, consciousness returned, and a frightful dyspnœa, with very deep respiration, diminished, while the condition became positively hopeful; but the improvement was temporary, death occurring in twenty-four hours.

Von Ziemssen is also inclined to believe that, although a rigid diabetic diet may be borne for a long time, it after awhile becomes harmful to the patient, even if considerable fat is permitted, and predisposes to diabetic coma. He illustrates his view by the case

of the diabetic daughter of a mild diabetic, who, being also a chemist, had sought to prolong the life of his daughter by a most rigid diet. She fell into coma and death followed.

Treatment of Diabetic Gangrene.—The question of the propriety of operative treatment for diabetic gangrene seems not to be altogether decided, although most surgeons deprecate operation. Max Schüller⁴ _{Dec. 3, 1888} takes the ground that all operative procedures should be omitted, and the treatment should be confined to anti-diabetic measures. He says many cases in this way are readily controlled, while others, notwithstanding the most rigid anti-diabetic diet, steadily progress. In diabetic phlegmon, on the other hand, a proper antiseptic treatment is often more important than the antidiabetic treatment, although the latter should be instituted. But, in consequence of the fact that in diabetic tissues the streptococcus seems to have a nidus so much more favorable for its growth, it is important that the antiseptic measures—draining, washing, and dressing—should be more energetically carried out than in other surgical conditions. Sublimate injections should be freely used, so that they may reach the deepest part of the tissues. For the accompanying fever antipyrin is to be used internally, because it appears to exert a controlling influence over tissue-change and would seem to be indicated by the diminished specific gravity of the urine under its use. He says, moreover, that its effect in restraining the sugar excretion appears to be much less than has been claimed by the French authors.

More specifically as to diabetic gangrene, the local treatment must be strictly antiseptic. Since the gangrenous parts infect the adjacent sound parts, incisions into the gangrenous and neighboring tissues and their thorough infiltration with sublimate solutions is useful. The circulation may be favored by moist antiseptic bandages or warm sublimate baths. We have, of course, to associate with this a rigid diet. Is amputation ever justifiable in gangrene? In reply to this question, Schüller gives the language of Koenig, quoted in the ANNUAL for 1889: "If, in diabetic gangrene, notwithstanding the antidiabetic diet and antiseptic treatment, the general diabetic and local phlegmonous phenomena do not abate, so that further delay involves great danger, then, under most careful antisepsis, amputation may be done to save the life of the patient." The same may be said when, although the sugar secretion

ceases, the gangrene still progresses. In both cases the difficult point to decide is how long the surgeon shall wait. The criteria vary under different circumstances, but Schüller says the rapid progress of the gangrene demands the use of the knife, when the operation should be done as far as possible above the seat of the gangrene.

It must be admitted that the temptation to operate in cases of diabetes is a very strong one, but evidence is daily accumulating which proves operation should be avoided whenever it is possible. Quite an important observation tending to prove this was made by Albert Hoffa,³¹ which goes to show that operation is dangerous, too, even in those who have apparently recovered from diabetes. The case in question was that of a man 60 years old, who, although he had diabetes for several years, had been without sugar in his urine for two years. There was, however, slight albuminuria. He developed cancer of the rectum. His general condition at the time was excellent, and there was no sugar and only a trace of albumen. The operation was successfully performed; reaction was perfect, his strength was good, and there was every reason to believe that he would do well. The urine, drawn the evening after operation, contained 2.4 per cent. of sugar. The next morning the sugar had disappeared, but during the following night the patient was restless and gave the impression that he was poisoned with iodoform, while the urine contained iodine. The iodoform dressing was removed and sublimate gauze was substituted. The same evening the urine contained some iodine, a trace of albumen, but no sugar. This continued for two days, but as the iodine diminished the sugar returned, and four days after the operation there was only a trace of iodine, while there was 2 per cent. of sugar. The next morning there was 4 per cent. of sugar, the iodine was scarcely detectable, and there was a strong smell of acetone in the room. The patient soon fell into diabetic coma, and died shortly after. Hoffa refers to a similar case in the hands of L. Landau, who extirpated the uterus for carcinoma, from a woman 47 years old, who had diabetes, but from whose urine the sugar had disappeared. The sugar immediately returned, diabetic coma set in, and the patient died in two days, whence it is to be inferred that only unavoidable operations should be performed. It is true, on the other hand, that operations are not always followed by unfavorable re-

results. Thus, Verneuil reports good recovery in diabetes after the amputation of the penis and exsection of the tongue; but, as Hoffa says, more is to be learned from 1 unsuccessful case than 10 successful ones. It is to be remembered that there was in this case also albuminuria. The explanation of the unfavorable termination lies simply in the fact that the saccharin secretions afford a favorable soil for the growth of the ordinary septic micro-organisms, and there is otherwise nothing peculiar in it.

Treatment of Eczema.—No more annoying symptom occurs in diabetes than the itching which attends eczema, so often present. No single remedy is found always efficient. It becomes desirable, therefore, to have numerous resources for this purpose. H. V. Nieman¹²¹ Dec., '98 has found, after a trial of numerous remedies, an ointment composed of subnitrate of bismuth and pyrogallic acid, with lard as a basis, the quantities not obtainable. The ointment is applied twice daily, after washing with a strong decoction of white-oak bark; the latter, with equal parts of fluid extract of hydrastis and fluid extract of eucalyptus, applied twice daily, is also advised. Also, an ointment recommended by J. V. Shoemaker, consisting of calomel, 20 grains (1.3 grammes); acetate of lead, $\frac{1}{2}$ drachm (2 grammes); extract of belladonna, 15 grains (1 gramme); subnitrate of bismuth, 1 drachm (4 grammes); carbonate of zinc, $\frac{1}{2}$ drachm (2 grammes); benzoated lard, 2 ounces (62 grammes): applied once a day, the parts being painted twice a day with phénol-sodique.

Treatment of Syphilitic Diabetes.—Lemonnier⁴⁵⁴ Oct., '98 ⁸² Aug. 10 reports the case of a man, aged 50 years, who had been suffering an indefinite time with diabetes. His condition grew worse from day to day, until the discovery of a gumma in the pharynx gave evidence of syphilis of long standing, the existence of which the patient had denied. He was immediately put on antisyphilitic treatment, inunctions of mercury and iodide of potassium internally. In eight days a decided improvement in the gumma appeared, and there were 37 grammes (1 ounce $1\frac{1}{2}$ drachm) to the litre (1 quart), instead of 70 to 80 grammes (2 ounces 2 drachms to 2 ounces 4 drachms). Three weeks later no sugar was appreciable. During this time the patient made no attempt to follow a diabetic diet.

Treatment of Cataract.—Stoeber⁶¹ May 25 recommends that extraction should be practiced for cataract in diabetes, whatever the quantity of sugar in the urine, abstaining only from operations

when the state of emaciation and debility has reached a high degree. He recommends, however, the previous treatment of diabetes. All antiseptic precautions should be taken before and after the operation. The operation should also be deferred if there is grave amblyopia, symmetrical haemorrhages of the retina, and atrophy of the optic nerve.

Hygienic Measures Recommended to Prevent the Complications of Diabetes Mellitus.—Renault ³⁵ advocates, in order to prevent irritative fermentation of the liquids in the mouth, the frequent use of antiseptic mouth-washes. Fatigue or exposure to climatic vicissitudes should be avoided or guarded against, and long journeys should be forbidden. Tepid baths are recommended for the pruritus and erythematous, papular, and pustular eruptions caused by the deposit of the sugar in the glands. The genitals should be frequently sponged with tepid water and dusted with rice-powder or Fuller's earth. Great care should be taken to prevent even trivial traumatic lesions of the skin, which may have serious consequences. Careful attention to hygienic precautions will often indefinitely postpone the fatal course which so often terminates the disease.

SYPHILIS.

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PHILADELPHIA.

PROPHYLAXIS OF SYPHILIS.

Neumann,³⁹⁷ v.3, No.5 in a "Contribution to the Question of the Prophylaxis of Syphilis through the Regulation of Prostitutes," comes to the following conclusions: Prostitution should be under government control. There should be compulsory examination of all prostitutes. If diseased, they should be sent to special hospitals for treatment. During the early secondary period the most severe restrictions should be observed. Soldiers and sailors in government control should have periodic examinations, early and prolonged treatment in hospital, and should be kept under supervision after apparent cure. In addition, he urges the examination of factory hands and of wet-nurses; the State regulation of vaccination and circumcision; the establishment of a larger number of hospitals for syphilites; and the passage of international laws regarding syphilis and prostitution.

"Should Syphilitic Physicians Continue their Professional Work?" Neisser³⁹⁶ Sept. 28 discusses the above subject at some length, especially in reference to surgeons and obstetricians. He believes that the answer depends upon a number of factors: 1. The age or stage of the syphilis. The younger the disease, the greater the power of transmission. There is no proof of the existence of any infective quality during the late or tertiary stage. 2. Upon the character of the treatment, which, if careful and continuous, reduces both the chances of infection during the early period and at the same time shortens that period materially. 3. As to details, the existence of a syphilide on the hand is an imperative contraindication to professional activity, unless it is possible, in some safe mechanical way, absolutely to isolate the diseased region. 4. Infection by blood through accidental wounds or abrasions of the fingers of the operator is, of course, possible, but it is highly

improbable that this will occur through microscopic cracks or solutions of continuity, and it is very unlikely to happen after the first year of the disease. 5. Infection through non-specific skin troubles in the hands of the syphilitic may occur, as from pustules, eczema, fissures, etc. 6. As to all these matters, Neisser draws a sharp line between possibility and probability, and is strongly inclined to think that, with care as to the fingers, the use of protectives and disinfectants, etc., the medical man who has been so unfortunate as to contract syphilis may continue to practice his profession with safety to his patients. This conclusion applies with more force to the surgeon than to the obstetrician, whose patients are in greater danger.

TRANSMISSION OF SYPHILIS.

Lancereaux¹⁴ _{Nov. 6} reports 2 cases of the transmission of syphilis by the use of instruments, in one instance through an Eustachian catheter, in the other through the instrument of a dentist. In the former case the symptoms seemed to point to the existence of a chancre in the Eustachian tube.

Adrian Stourme²¹¹ _{June 28} has investigated the subject of cephalic chancre, having analyzed 103 observations carefully collected, and comes to the following conclusions: The primary incubation of cephalic chancre is about the same as that of an ordinary chancre; the sore has the same average duration. The secondary incubation is, on an average, thirty-eight days. The secondary symptoms were no more severe than usual.

E. Feibes⁴ _{Nov. 23} records the case of a man who contracted syphilis through an acne pustule, which was open and suppurating at the time he went to a strange barber. The buboes were in the right axilla, the cervical glands, and the submucular glands of the same side.

Lemaire²⁰³ _{Aug. 1} publishes a case of so-called herpetiform chancre, which he believes to be a form of initial lesion which disappears in a few hours. His paper was read at a meeting of the Medical Society of Rouen, the members of which were, however, of the opinion that such a history is quite incompatible with all that is known of the characteristics of chancre, and that the probability was that there had been a previous hard chancre which was overlooked. Edwin C. Burnet²⁴⁵ _{Sept.} calls attention to the frequency with which apparently typical indurated sores are not followed by secondary syphilis, and cites some interesting cases.

William Anderson²³ reports a case of primary chancre of the cheek. The man had an ulceration below the right eye, together with roseola syphilitica and angina faucium. He had sustained, seven weeks before, a blow upon the cheek, with slight abrasion and ecchymosis. A friend sucked out this wound, and, being syphilitic, infected it with a chancre.

Francis B. Greenough¹, believes that syphilitic lesions, when situated in the urethra, differ materially from those situated in other portions of the body from the fact that they are so frequently washed by urine. The pain caused by this might be lessened by dressings of iodoform and by immersion of the penis in tepid water. The local influence of lesions of the urethra might not cease, even when they were healed, as the action of a cicatrix, of adhesions, etc., might continue indefinitely. Many lesions of the meatus might show themselves as indurations without a solution of continuity. Cases supposed to be mere examples of gleet had been sent to him. He discovered an indurated lesion of the meatus, which was soon followed by the eruption of a syphilitic roseola. The amount of induration varied in different cases. Often it would not extend beyond the meatus, while again it might involve the whole gland, which became resisting and cartilaginous. Not infrequently syphilis was not recognized at first, because the primary lesion was not seen, being hid in the urethra. A sclerosis of the meatus acted as a stricture, and might give rise to the same series of symptoms as the latter. It is possible for the opening which is sometimes seen in a meatus, that has been the seat of follicular abscess, to be the seat of the primary lesion.

Barker²⁴, reports 5 cases of extra-genital chancre, due to tattooing, the operator suffering at the time from mucous patches of the mouth. In all of the cases the sore was single and of the true Hunterian variety.

Pospelow²⁵ discusses exhaustively extra-genital infection. To his article is appended a very complete bibliography of the subject. His conclusions are that in Moscow extra-genital syphilitic infection is, in the working classes, much more common among women than among men. The most frequent cause of this infection arises through the mouth, kissing or eating and drinking out of the same vessels being means of diffusion especially noteworthy. The next most important factor is by means of nursing at the

breast. The mother has frequently been infected by her own child after the latter has been intrusted for a time to a syphilitic nurse.

Ignaz Neudörfer ⁸ _{Nov. 29, '88, to Jan. 5} opposes the microbial theory of syphilis. He believes that the essential cause of all physiological and pathological occurrences must be sought for in the conditions of the living cell and in the changes in the bioplasm, but not in the presence of micro-organisms.

DIAGNOSIS OF SYPHILIS.

Vajda, ⁸⁴ _{Mar. 9 to May 18} in a contribution to the clinical diagnosis of syphilitic infection during the time of incubation, comes to the following conclusions: 1. Every syphilitic infection is accompanied by swelling of the lymphatic glands. 2. In the beginning the swelling of one particular gland is preponderant. 3. The enlargement of the glands varies from the size of a lentil to that of a small apple. 4. Originally, the swelling is unilateral, later bilateral. 5. Syphilitic adenitis may run on to suppuration, but does so more slowly than a simple adenitis, and at the same time the glands of the other side become affected. 6. The syphilitic swelling of the glands appears from the eighth to the fourteenth day of the infection, and never disappears entirely during the ordinary period of secondary incubation; that is, in seven weeks. 7. Induration of the spot of inoculation and intumescence of the lymph-glands belonging to the latter are ordinarily synchronous, but the swelling of the gland may be the only symptom of contamination during the whole period of incubation. Syphilis, however, never appears without glandular enlargement, which is the most constant symptom of the early periods. 8. There is a definite relation between the primary ulceration and the condition of the glands. If there is only an erosion without a specific induration, then the glands are very little swollen; if the primary sore is more pronounced, the glands are correspondingly more swollen; while, if at the spot of inoculation a genuine ulceration appears, the glandular tumor is much larger.

A discussion on "The Diagnostic Value of the Tolerance of the Iodides in Syphilis" took place between H. C. Wood and myself. ⁸⁰ _{Dec. 22} H. C. Wood, writing of cerebral syphilis, says: "In all cases of doubtful diagnosis the so-called therapeutic test should be employed, and if 60 grains (3.90 grammes) of iodide of potassium per day fail to produce iodism, for all practical purposes the person

may be considered to be a syphilitic." Jullien asserts that "the existence of syphilis contributed powerfully toward producing tolerance of the iodides. Experience proves, in fact, that in persons free from this poison the toxic phenomena of iodism are much more to be dreaded. In the same manner, an antidote may be dangerous, or even fatal, when the organism is not under the influence of the poison which it is intended to combat." These statements, if well founded, convey an important practical lesson, which is of the greatest value in the diagnosis of obscure conditions suspected to be of syphilitic origin. If unfounded, they may be seriously misleading. It is my opinion that iodism is due to personal idiosyncrasy, and that the presence or absence of syphilis has nothing to do with its occurrence.

The cases quoted by me in this discussion, while altogether insufficient to generalize from, seem to me interesting examples of the fact that there is some other element than the existence of syphilis in any stage which determines the production or non-production of iodism, and, when taken in conjunction with the absence of satisfactory evidence in the opposite direction, appear to justify the following conclusions:—

1. Personal idiosyncrasy is so strong a factor in relation to the toxic symptoms produced by the iodides that it quite overshadows any possible influence due to the existence of syphilis.

2. There are no satisfactory theoretical grounds for believing that syphilis in any stage prevents the production of iodism by a process of neutralization, and this is particularly unlikely to be true as regards the latter stages.

3. It is therefore most unsafe to base any diagnostic conclusion upon the presence or absence of toxic symptoms (iodism) after the administration of full doses of the iodides.

H. C. Wood, in rebuttal, appeals to his large experience in cases of nervous syphilis, and says: "This experience has demonstrated to me—as a proposition whose truth is established—that in nerve syphilis there is usually an extraordinary tolerance of the iodide, so that almost all such syphilitic subjects will bear doses of 20 grains (1.30 grammes) and over, frequently repeated; it is, indeed, true that there are a few persons who are suffering from undoubted syphilis, but in whom this tolerance does not exist, but such patients are exceptional.

"There are a very few healthy persons who can take the iodide at once in large doses without any serious inconveniences, and there is a still more numerous class in whom tolerance of the iodide can be established by commencing with smaller doses and gradually increasing the dose. The vast majority, however, of persons who are free from syphilitic affection cannot take doses of over 10 grains (0.65 grammie) of the iodide, three times a day, without the production of iodism, unless as the result of the habitual use of the remedy.

"When iodides are tolerated by the normal individual, such individual is said to have an idiosyncrasy, which makes him an exception to the general rule. In syphilites this rule is reversed, and when the person suffering from syphilis cannot endure iodides the lack of tolerance is due to an idiosyncrasy, *i.e.*, the individual is an exception to the general rule. The number of exceptions to the rule in either case is so small that, for the purposes of practical medicine, when we find that a person can tolerate large doses of the iodides, the probabilities that such a person is suffering from syphilitic infection are so strong as to warrant the diagnosis of syphilis, if the tolerance of the iodide is accompanied by the presence of symptoms of organic disease not readily explainable." I concluded the discussion by saying: "I would be thankful for the existence of such a diagnostic rule as is formulated by Wood; but I think I have tested it thoroughly, and, basing my views both on the theoretical considerations which I have advanced and on my clinical experience, I cannot, even after reading Wood's very able paper, see any reason for changing my opinion." The following writers⁸⁹ _{Mar.} published articles on this subject, and, without exception, agreed with me: James Stewart, Montreal; James Nevins Hyde, Chicago; Fessenden N. Otis, New York; John P. Bryson, St. Louis; John B. Chapin, Philadelphia; Edward N. Brush, Philadelphia; R. W. Taylor, New York; F. R. Sturgis, New York; McCall Anderson, Glasgow; Edward L. Keyes, New York; Edward Park, Buffalo; and William Osler, Philadelphia.

TREATMENT OF SYPHILIS.

Time for Beginning Treatment.—McCall Anderson, of Glasgow,²⁴⁵ _{Nov.} thinks treatment should only be begun when unmistakable signs have shown themselves. Mercury is not alone of value

in the earlier stages, but is followed by the happiest results often in tertiary syphilis, especially in lesions of the nervous system and where the iodides have been tried to no purpose. Inunctions and injections are to be preferred to the administration of the drug by the mouth, when practicable. Treatment should be continued for a year after all symptoms have disappeared.

Langlebert thinks treatment should commence with the prodromata of the secondary period,—headache, fever, etc.,—and should be continued during the whole period of eruption. He never gives mercury in the intervals between the manifestations upon the skin or mucous membranes, as he regards the drug as powerless to prevent such manifestations. On the other hand, the iodides were pre-eminently suited for chronic syphilis. The average time of treatment by the iodides should be about three years. Arsenic, iron, quinine, and sulphur are of value as tonic remedies, but should always be secondary to mercury and the iodides.

F. D. Bird²⁸⁵ holds that secondary symptoms nearly always appear in some recognizable form, no matter how soon mercury is administered. If this were not so, he thinks it would be better to wait for the appearance of secondaries before giving mercury in doubtful cases. In a number of cases in which specific treatment was used from the first, one, at least, of these three manifestations could always be found: (1) an ordinary modified rash on the body or thighs; (2) the presence of one or two papules on the dorsum of the tongue; (3) a few papules on the hairy scalp, not ulcerating nor tuberculating, but with a scurfy summit, and feeling like duck-shot beneath the finger. These last he has come to look upon as pathognomonic of syphilis. He values highly the local treatment of all symptoms in all stages. As the tertiary stage progresses, the lesions become more and more local and therefore the necessity of treating them locally becomes greater. Thus, in serpiginous ulceration of the skin or mucous membranes, general constitutional treatment is, of course, a great factor in the cure, but not nearly so important, in his opinion, as the local application of mercurials. This is exemplified in the comparative ease with which we can heal an ulceration which we can actually touch, *e.g.*, on the hard palate or on the leg, and the trouble we have with a syphilitic ozæna, which we can get at locally only by means of injections and vapors. Bird points out that many soft sores become indurated,

and are followed by constitutional syphilis, the blood-poison being probably inoculated at the same time. His experience is that, however soon antisyphilitic treatment is commenced, secondary rashes or affections of mucous membranes develop. He points out the almost constant appearance of slight superficial proliferation and ulceration of the cheek and gum opposite the second molar tooth. In his experience, initial lesions occurring away from the genitals are followed by considerable glandular enlargement. He refers to the occurrence of tertiary ulceration at the site of the initial lesion.

Karl Ullmann ^{May 23, 19} reports a case in which several indurated sores appeared on the genitals of the same person at short intervals; they were of an undoubted syphilitic nature. The induration was situated at the urethral orifice, and the origin of the others could only be accounted for by autoinfection.

In an article on the "Abortive Treatment of Syphilis," ^{Oct. 27, 189} I ventured to formulate the following conclusions ⁹: 1. While it is unquestionably desirable to begin mercurial treatment at the earliest proper moment, and while that treatment undoubtedly either suppresses or renders milder the secondary manifestations; and while there is every reason to believe that in this way the liability to later or tertiary lesions is somewhat lessened; nevertheless, the sum-total of these advantages does not warrant the employment of mercury one moment before the diagnosis of constitutional disease is absolutely assured. 2. While in many cases that diagnosis can be made with a high degree of probability from the appearance of the primary sore alone, yet it cannot be said that all possibility of error is excluded until some general symptom, such as the enlargement of distant lymphatic glands, has shown itself. 3. The administration of mercury during the existence of the primary sore, unaccompanied by general symptoms, for the purpose of suppressing or "aborting" syphilis, is not, therefore, justifiable, unless by confrontation the diagnosis can be confirmed, or unless there are urgent and unquestionable reasons for securing rapid cicatrization of the chancre. 4. It is proper to employ cauterization or excision, according to the site of the chancre, in cases in which it is seen very soon after its appearance, and especially when it is known to have followed intercourse with a syphilitic person. The chances of preventing constitutional infection in this way, while

very slight, may be considered sufficient in such cases to counterbalance the disadvantages of the method, such as pain, swelling, the production of phimosis or of suppurating bubo, and the obscuring of the diagnosis by the resulting inflammatory exudation. 5. Aseptic or antiseptic measures, while harmless, cannot be considered especially indicated in the local treatment of chancre, and can, in all probability, have no true abortive influence. 6. The local use of mercurials, hypodermically or by inunctions, is perhaps worth a trial, but it is probably inferior to the more radical methods, based essentially upon the same principles, namely, excision and cauterization.

Verneuil¹¹²⁶ _{v.s} draws up the following *résumé*, which expresses his opinion upon the treatment of syphilis: 1. Syphilis should be treated as soon as ever the diagnosis is made out; there is no advantage to be derived from waiting. 2. Although expectation enlightens the practitioner with regard to the evolution of the disease and the degree of its severity, on the other hand it causes loss of valuable time. 3. The treatment must be long and patiently persevered with, because syphilis is a disease of long duration, the cure of which requires about two years. 4. Syphilis, without doubt, may cure itself spontaneously, but such cases are rare, and cannot be foreseen. Even though the treatment should be useless, it does not appear to give rise to any serious inconvenience. 5. Until the fact can be disproved, mercury still remains the most powerful remedy known for syphilis in its first periods, although its direct action upon the virus has yet to be proved; it is, nevertheless, certain that it modifies advantageously the isolated and successive manifestations of the disease in general. 6. At least as efficacious as any other means in the treatment of syphilis of average intensity, it is quite indispensable, and cannot be replaced by any other substance in the treatment of severe and tenacious syphilides in visceral syphilis, in the variola of pregnant women and of newborn infants. 7. A well-directed mercurial treatment in connection with hygienic resources, proper regimen, and the use of tonics is, in the great majority of cases, perfectly harmless; it is well, therefore, to destroy the prejudice of the public in this respect. 8. The problem of curing syphilis without the use of mercury is not yet solved; nor does it appear likely to be solved in the near future.

Local Treatment.—Hallopeau¹⁷ _{act.s} believes that local antiseptics

should be systematically used in all accessible manifestations, as each of these manifestations should be considered a centre of re-infection. This fact is evidenced by those syphilides which first appear as a papular or an initial tubercle, and around which lesions appear, after variable periods of time, other papules, each of which in its turn becomes a new centre of infection. Local treatment in these cases is a powerful aid to the general treatment, and should therefore be employed. If a profound and energetic effort is desired recourse must be had to caustics, of which the acid nitrate of mercury and powdered corrosive sublimate are the most used. It is well known that acid nitrate of mercury is a powerful remedy in cases of syphilides of mucous membrane. Specific vegetations, which have resisted many months of general treatment, disappear after one or two cauterizations, as do also lingual patches and ulcerations. The fear of the pain of the application has often prevented its being used; but cocaine to-day makes its use almost painless. The cauterization of the mucous syphilides by nitrate of silver, which is only moderately efficacious, should be abandoned and universally replaced by the acid nitrate of mercury. Powdered corrosive sublimate exercises a caustic action which should be closely watched, for it should be limited exactly to the part which one wishes to reach. It can be used as a means of aborting recent chancre, if unaccompanied by adenopathies indicating the generalization of the disease; and though the attempts made in this direction have been so far unfruitful, they are few in number and should be repeated.

The continuous application of sublimate solution, of a strength varying from 1 to 500 to 1 to 2000, is of the greatest service; the diseased parts are covered with compresses impregnated with the solution, then with oiled silk; this forms a sort of permanent local bath. Not painful, and easy of use, it constitutes one of the surest means of rapidly improving specific ulcerations.

Stukowenkow⁵⁶ warmly recommends, in syphilis, chancroid, and gonorrhœa, a new mercurial preparation—benzoate of mercury. It contains 43 per cent. of metallic mercury. This salt is a tasteless and odorless white crystalline substance, which is only slightly soluble in cold water and ether, but dissolves easily in alcohol, as well as in a weak solution of sodium chloride (8 parts of the salt require 2 parts of the sodium chloride). The author

employed the drug in 300 cases of syphilis, chancroid, and gonorrhœal urethritis and cystitis. The mode of its administration varied as follows: 1. It was injected deeply into the gluteal region in solution. Introduced in this way, the drug acts swiftly; roseoles wholly disappeared after three to ten injections, papules after six to fifteen, tubercles after eight to twenty, periostitis and gummata after twelve to twenty-four. Intense salivation does not occur. Gingivitis is rare and mild. 2. It was injected in the form of a 10-per-cent. emulsion. Roseoles and other syphilitic symptoms disappear after two or three (double) injections of 0.10 to 0.15 grammes ($1\frac{1}{2}$ to $2\frac{1}{2}$ grains) of the drug. The procedure causes a slight burning, which sometimes lasts for two or three days. Moderate gingivitis and salivation are rather frequent. 3. Or it was given internally in pills (with some bitter extract and licorice-root), beginning with 0.006 to 0.021 grammes ($\frac{1}{16}$ to $\frac{1}{3}$ grain) at a time, twice daily. The therapeutic effects are comparatively weak. Roseoles begin to disappear on the twelfth to the fifteenth day, after 40 to 60 pills have been taken. Occasionally (in 2 cases out of 15) diarrhœa follows.

Hypodermic Medication.—Leloir and A. Tavernier⁸²⁴ record the results of their experience with the hypodermic injections of (a) calomel and vaselin, 1 to 12 (875 injections); (b) yellow oxide and vaselin, 1 to 12 (642 injections); and "gray oil," purified mercury, 4 parts; ethereal tincture of benzoin, 1 part; vaselin, 8 parts (56 injections). The retro-trochanteric region was used; $\frac{1}{2}$ syringeful (Pravaz) was used for the first two, $\frac{1}{3}$ for the last formula. The intervals were eight or nine days. They note the following complications observed in the series of 1573 injections: (a) local pains, sometimes radiating, preventing movement, lasting from one to nine days; (b) paresis of the lower limbs; (c) vertigo, headache; (d) occurrence of buccal mucous patches four or five days after the injection; (e) local mercurial irritation around the point of injection; (f) mercurial stomatitis; (g) diarrhœa, simple or bloody; (h) cutaneous swellings, hard, or sometimes vesicular, not going on to suppuration.

As to the value of these injections, they come to these conclusions: 1. The treatment of syphilis by subcutaneous injections should be reserved for the erythematous eruptions and consecutive syphilides of the tegumentary surface. 2. The method should be

employed when it is desired to make these eruptions disappear with extreme rapidity. 3. It is especially applicable to hospital patients, *i.e.*, to those who can be kept in bed. 4. It has but a slight action on the syphilides of mucous surfaces. 5. It has no influence in preventing early relapses. 6. In many cases it fails when inunctions succeed. 7. It should not be employed in cerebral, spinal, or visceral syphilis, nor in the syphilis of pregnant women, nor in infantile syphilis. Its only advantage appears to be its rapidity of action.

A. I. Tschernoguboff, ¹⁰⁰⁸_{No.5,p.169; June} ⁶⁹⁷ house-surgeon to the Miasnitzky Syphilitic Hospital in Moscow, recommends the treatment of syphilis by hypodermic injections of hydrargyrum oxydatum flavum, in 2-grain (0.13 gramme) doses, repeated every ten or eleven days. Having tried the method in 120 consecutive cases, he has arrived at the following conclusions: 1. When used in such large doses the oxide cuts short all syphilitic manifestations much more rapidly than when administered in small quantities. As a matter of fact, in the author's cases "cure" followed, on an average, in 16.4 or 17 days. 2. In 92 per cent. of cases one or two injections prove sufficient to cut short all symptoms. 3. In some cases of syphilitic ulcers and gummatæ, however, the iodide-of-potassium treatment is to be resorted to. 4. Gingivitis or stomatitis occurs only in 8 per cent. of cases of recent syphilis and in 26 per cent. of those of syphilitic relapses. 5. To prevent local phenomena (such as pain, swelling, etc.), the injection into subcutaneous cellular tissue (best of all, of the back) should be preferred to intra-muscular ones. 6. As a rule, the treatment does not accelerate the course of the disease. 7. Relapses occur as often as under any other therapeutic treatment. 8. Children (of 12 to 14) tolerate the drug well (when it is injected in 1-grain doses). 9. The method, like any mercurial treatment generally, is contra-indicated in cases of advanced anaemia (independent of specific cachexy), general exhaustion, pronounced alcoholism, chronic inflammation of parenchymatous organs, and extensive dental caries. 10. Pregnancy, however, does not contra-indicate the use of large doses of the oxide. 11. Mercury is detected in the patient's urine (after Witz's method) in from four to eight hours after the injection.

While Smirnoff, of Helsingfors, ¹⁰⁰⁸_{No.5,p.158; June} ⁶⁹⁷ feels quite sure that

Scarenzio's method, modified by himself, represents something like an "ideal perfection" in the therapeutics of syphilis, Tohiskiakoff, of St. Petersburg, draws attention to the fact that the hypodermic injection of mercurials, especially of insoluble compounds, is associated with severe pain as well as with occasional more or less grave constitutional toxic symptoms. As far as soluble salts are concerned, the symptoms are caused by a more or less unexpected simultaneous absorption of the drug introduced from multiple foci or "beds," in which it has been lying inert ("stored") after as many injections. The practitioner is unable to control the process or to subject his patient's system to the action of definite (desirable) doses of the drug. All hypodermic injections being more or less unsatisfactory, the author undertook extensive clinical experiments in order to work out a better plan of injection. He believes that he has ultimately succeeded in discovering such a one in the injection of emulsions prepared with the corrosive sublimate or cyanide, or salicylate of mercury, with vaselin oil as the vehicle. The salts should be administered in 1-grain (0.065 gramme) or even larger doses, the injections being repeated every week. The author tried the salicylate in 194 patients, the sublimate in 70, and the cyanide in 11, the average number of injections in individual cases being about nine or ten. From those experiments he derives the following conclusions: 1. The injections (especially those of salicylate of mercury) are associated with but trifling pain, lasting usually a few hours, never more than twenty-four. They never rise to local suppuration. They cause, now and then, doughy infiltrations, but the latter melt away in a couple of days. 2. The absorption of the dose introduced is very gradual and complete. Hence, a precise dosage is attainable. 3. The sublimate emulsion is most suitable in such cases where a more or less energetic treatment is indicated, while the salicylate one is to be used especially in delicate and very sensitive persons.

The neutral salicylate of mercury—a white, amorphous, tasteless, and odorless powder, scarcely soluble in alcohol and water—was first introduced as a remedy in the treatment of venereal affections by Silva de Aranjo, of Rio Janeiro,⁸⁰ June 15, who claimed for it that it had less influence upon the alimentary tract, and was better borne by the system than any other preparation of mercury; and that its action in syphilis was exceedingly energetic and effective, so that it

sometimes brought relief when the older preparations of the metal had failed. The publications of Aranjo were followed by a number of papers from Brazilian physicians, and also attracted attention in Europe. In 1887, Szadek, of Kiew, especially commended the remedy as an injection in cases of gonorrhœa, employing the following formula:—

R Hydrargyri salicylatis, . . 0.10 grammie (gr. iss).
 Aque destillatæ, . . . 250 grammes (3vij).
 Sodii bicarbonatis, . . . 1 to 1.3 grammes (gr. xv to xx).—M.

He also gave details of 12 cases in which he had practiced 120 intra-muscular injections of the salt with most excellent result. For this purpose he employed the following formula:—

R Hydarg. salicyli, 0.2 grammie (gr. iij).
 Mucilag. gummi arabici, 0.3 grammie (3lv).
 Aque destillatæ, 60.0 grammes (5ij).—M.

He gave the injections at intervals of two or three days, and repeated them from six to twelve times in an individual case. He especially affirmed that the salicylate produced, when injected under the skin, absolutely no disagreeable local manifestations.

Epstein, of Nuremberg, in experiments in which he injected upon one side the salicylate and the other calomel, found that the salicylate was much less apt to produce local symptoms than was the other mercurial.

Arthur Plumert, of Prague, did not obtain extraordinarily good results in gonorrhœa with the injections of salicylates; but, on the other hand, confirms its value in the treatment of syphilitic troubles; especially does he commend its hypodermic use. In not one of the 24 patients upon whom he employed these injections were there any local symptoms, but in 1 case stomatitis followed.

Jadassohn and Zeising, assistants of Neisser, of Breslau, employed a 10-per-cent. solution of the salicylate in a pure liquid paraffin, and treated 141 patients with 434 intra-muscular injections. In 45 of the patients there were slight local symptoms, and in 4 cases these symptoms were somewhat severe. In all cases the effect upon the specific disease was very rapid and pronounced.

Neumann, at Vienna, has employed with satisfaction the salicylate internally, in the form of pills, in 1 old case and 20 recent cases of syphilis. He also, in 11 cases, used the hypodermic injec-

tions without ever noticing any local irritation. In a recent thesis upon the subject, Theodore Schreus⁴⁵ _{p. 93} reports a number of cases which have been treated in the clinic Doutrelepong with hypodermic injections of a 10-per cent. suspension of the salicylate in paraffin, the size of the injections being such that the patient received each time $1\frac{1}{2}$ grains (0.1 grammes).

The whole list of reported cases in which the mercurial salicylate has been employed intra-muscularly amounts to 219, with 1518 injections, and there seems to be a general consensus of opinion as to the value of the method and the freedom of the preparation from irritant properties.

The following precautionary methods were observed by Schreus:—

1. Wash the part to be injected with a warm carbolized solution.
2. Wash the syringe and needle with warm carbolized solution before and after each injection.
3. Have the chill taken off the mercurial solution by placing the bottle in hot water while making the other preparations.
4. Inject with a sharp, fine needle deep into the muscles of the buttocks.
5. Alternate the injection, from day to day, from right to left side.
6. After removing the needle use friction over the point of injection for a few seconds.

Much trouble is caused by the needle used, the action of the bichloride on the metal corroding it and making it brittle; but he has found that if the needle be well greased with vaselin before and after each injection this could be obviated; also, the small wire inserted through the needle should be anointed. With these precautions he has used the same needle for five months. The solution used was as follows:—

B Hydrargyri bichlor., . . . gr. iij (0.19 grammes).

Sodii chlor., . . . 5ss (1.95 grammes).

Aqua destil., . . . 3x (40.0 cubic centimetres.)—M.

Inject 10 minims to 20 minims (0.62 to 1.23 cubic centimetres). It is advised to give some simple tonic during the time the treatment is being continued.

Silva de Aranjo, ³⁰³ _{Jan. 31; Mar. 16}, at a recent meeting of the Clinical Society of Rio de Janeiro, read a paper on the therapeutic uses of salicylate of mercury, for which he claimed the following advantages: 1. It is easily supported by the stomach; it does not produce gastralgia or diarrhœa,—symptoms which are so frequently the outcome of the administration of other mercurial preparations, including the proto-iodide and tannate of mercury, which lately have

been used very extensively. 2. Salicylate of mercury never produced mercurial stomatitis. 3. Taken internally it acts with greater promptness than any other mercurial preparation heretofore used. Hearing of Aranjo's statement, Carl Szadek, of Kiev, collaborator, administered this remedy to 25 syphilitics, and from the results obtained confirms the statement of Aranjo.

Basing his views on extensive comparative observations of his own, Sukhoff, of Cronstadt,<sup>1008, 697
No. 5, p. 157; June</sup> arrived at the following conclusions concerning the therapeutic value of the hypodermic method in syphilis: 1. As regards its effectiveness (that is, its power of removing all visible manifestations of the disease), the method is equivalent to the classical methods of inunctions. 2. Its advantages are these: (a) the practitioner remains the master of the situation all through; (b) the drugs required are easily obtained in the chemically pure state, and solutions or emulsions may be prepared by the practitioner himself at any time; (c) in the case of soluble substances, a most precise dosage is attainable; (d) the method may be conveniently practiced in outdoor patients, which is of paramount importance in country, military, and pauper practice; (e) it saves a good deal of time and labor, since an injection is by far a more easy and rapid procedure than an explanation to the patient in regard to the use of the drugs; (f) the injection of insoluble (suspended) preparations shortens the time necessary still more considerably; (g) the patient's skin and digestive organs remain intact (except in comparatively rare cases of general mercurial poisoning); (h) stomatitis is of comparatively rare occurrence; (i) in view of *g* and *h*, no special cleanliness about the skin and mouth is required; (j) the method is free from any injurious toxic influence on the patient's surroundings; (k) it may be successfully practiced in such cases where inunctions are inconvenient, because of a peculiar irritability of the skin or on account of some profuse rashes; (l) it enables the patient to conceal his disease from his fellow-men; (m) in hospital cases the average duration of the hypodermic treatment (the number of hospital days) is smaller than that of the treatment by inunctions; (n) since the method involves less time and smaller expenses in regard to drugs, etc., it is eminently suitable in poor practice. 3. Its drawbacks are these: (a) the injections are painful, and hence cannot be practiced on children; (b) when any insoluble mercurial prep-

arations (except cinnabar) are employed, and that in large doses, there develop almost invariably local indurations, which constitute an extreme annoyance to the patient; (c) in such cases where the use of insoluble compounds gives rise to mercurial poisoning, the treatment of the latter proves to be exceedingly difficult. 4. Insoluble preparations present the advantage over soluble ones in allowing longer intervals between the injections, but, on the other side, the effects desired are obtained in the former case later than in the latter. Further, the use of soluble salts is followed by stomatitis much less frequently, and when the complication arises it is usually mild, and yields to appropriate means fairly easily. Hence, the salts should be preferred to insoluble mercurial compounds, especially when there are present more or less grave symptoms requiring rapid relief. In outdoor hospital cases they are inconvenient on account of the procedure requiring frequent repetitions. 5. Of all the mercurial preparations yet proposed for hypodermic use in syphilis, cinnabar is by far the best, since, while fully effective, it causes neither pain nor induration.

During a discussion, Oscar V. Petersen, of St. Petersburg,⁵³⁰ has stated thus: 1. The hypodermic method represents a distinct improvement in the treatment of syphilis. 2. The injection of insoluble mercurials should be preferred to that of the soluble ones, since in the former case the procedure may (and must) be repeated not more frequently than once a week. 3. Calomel causes local pain and sometimes suppuration. 4. Yellow mercurial oxide, when in a chemically pure state, as a rule does not give rise to pain, but, unfortunately, the preparation is far from having a constant composition. 5. The best insoluble compound is salicylate of mercury, which should be injected in 1- or $1\frac{1}{2}$ - grain (0.065 or 0.097 gramme) doses, once weekly. In none of Petersen's 40 consecutive cases treated by the salt was any pain ever complained of. 6. As regards rapidity of the action there is no difference between insoluble and soluble mercury.

On the ground of 200 successive cases, Behrmann, of Moscow,¹⁰⁰⁸ ⁶⁹⁷ No 2, p. 58; June lays down the following propositions: 1. Aqueous solutions of corrosive sublimate should be preferred to all other mercurial preparations employed in the therapeutics of syphilis. 2. Hypodermic injections of the solution are tolerated by patients better than all other soluble or insoluble mercurial compounds.

3. The injections do not give rise to local abscesses. 4. Stomatitis occurs but seldom—certainly more rarely than in the treatment by imunetions. 5. Relapses are observed less frequently, and when they occur they are characterized by comparatively milder symptoms. In the course of a discussion following Behrmann's communication, M. I. Stukovenkoff, of Kiev,<sup>1008
No. 5, p. 160</sup> strongly objected to the author's generalizations concerning the sublimate. According to his personal experience, the hypodermic use of the preparation is associated with considerable pain and suppuration. Besides, the salt only too often corrodes the needle, which circumstance leads to traumatic injuries of the cutis, with subsequent formation of sloughs. Further, stomatitis is far from being a rare occurrence, —at least, in such cases where the sublimate is injected in not very small doses. Generally the substance is not tolerated better than other mercurial preparations: in that regard it is incomparably inferior to succinate and oleate of mercury.

In reply, Behrmann said that no practitioner would employ a corroded needle (in other words, nobody would use a needle more than 100 or 150 times), and that stomatitis could be prevented by gargling and teeth-cleansing.

In regard to the latter point, S. T. Marenitch, house-surgeon to the Military Hospital in Vilna, drew attention to the fact that common prophylactic means, such as gargles, or cleansing the teeth by means of a brush with soap or dental powders, had proved inefficient in his hands. Hence, several years ago he had invented a very simple and cheap appliance for a mechanical removal of concretions about the teeth in mercurialized patients, the results having become since then excellent.

Metallic mercury, intimately mixed with oil, is one of the agents used by Raoult,⁷³ the proportion being 0.23 centigramme ($3\frac{1}{2}$ grains) to the cubic centigramme (0.18 minim). Luton and Prochoscow say that good results are obtained in from three to six weeks, without any disturbance of the digestive function.

Krecke, Kopp, and Scarenzio use calomel dissolved in glycerin mucilage, vaselin, or common salt, the dose being 10 centigrammes ($1\frac{1}{2}$ grains), administered every fifteen days. There is no pain at the time, but in 5 per cent. of the cases abscesses developed in three or four days, and in some there was stomatitis and vomiting. It is agreed that this method is much more valu-

able in the secondary than in the tertiary affections, and that the simultaneous injection of cocaine is advisable. The yellow oxide of the metal, the phenate, salicylate, and bichloride have also been tried.

Welander has employed a mixture⁴⁵ composed of 1½ grains (0.097 gramme) of the acetate of thymol-mercury to 15 of liquid paraffin. He gave each patient about six injections, with an interval of four days between each. Pain was moderate or absent. Symptoms disappeared promptly within three or four weeks. This injection is less painful than calomel, but as a result of its use its inventor records one case of abscess, several of stomatitis and diarrhoea, others of speedy relapse.

Radestock¹¹⁶ discusses the value of the preternatural activity of the skin in the treatment of syphilis. He is in the habit of ordering from the very beginning hot baths of the duration of half an hour, frequently repeated; large quantities of warm tea, subcutaneous injections of pilocarpin, and the use of vapor baths. He does not confine himself exclusively to this method, but believes that they render the disease more manageable.

H. v. Hebra, of Vienna,⁵⁷ urges inunctions as most desirable, but for out-patients, and in certain cases where rapidity of action is desired, advises injections. His preparation is made up of a solution of 1-per-cent. bichloride of mercury in a 6-per-cent. salt solution. The solution is transparent; if it becomes turbid it should be thrown away. This 1-per-cent. sublimate-salt solution is well borne by all patients. If necessary, it may be diluted by an equal quantity of distilled water. Every patient receives an injection daily into the nates, so deeply placed that it reaches the gluteal muscles. In 90 per cent. of cases twenty injections are sufficient to cause a disappearance of all syphilitic manifestations, the cure thus being obtained in three weeks. As for symptoms of mercury poisoning, these are practically not observed, or were so slight as to be of no consequence. According to Bockhart's investigations, after injections of the sublimate-soda solution, mercury could be detected in the urine for thirteen weeks. The mercury forms a combination with the albumen of the tissues, and this albuminate of mercury is slowly taken up by the circulation. The 1-per-cent. sublimate solution in water is, as Lewin observes, on account of its painfulness, less desirable than the sublimate-salt solution, although its action is about the same,

the mercury, however, appearing to remain longer in the organism and to be more slowly absorbed, since Bockhart has detected it in the urine eighteen weeks after injection.

The albuminate of mercury and the peptonate of mercury are especially commended by Bamberger. The first does not keep well. Both give very little pain on injection, and are quickly absorbed, Bockhart failing to detect traces of the salt after ten or twelve weeks. Recidivity is, however, more liable to occur than where more slowly absorbed preparations are used. Bockhart formed a combination with the blood-serum and mercury, so that, injected beneath the skin, it could be absorbed immediately without further change. This solution is neutral in reaction, and, if kept in a dark flask in a cool place, it remains clear for a long time. The injections gave no pain, and were followed by no inflammatory reaction. No symptoms of poisoning appeared. Slight stomatitis was observed only in a few cases. This solution is especially to be commended. It is, however, expensive. Where quick action is absolutely essential the three last-named forms of mercury should be used, and together with these should be classed the amides of mercury, as the mercury formamide of Liebreich, Wolff's and Nega's glycocol of mercury, and, finally, the cyanuret of mercury. Of these salts a trace only can be found after six weeks. As for the various forms of mercuric injection, in which the metal or one of its salts is injected into the body suspended in a neutral menstruum, absorption can only take place by a transformation of the mercuric salt into sublimate. Hence, the physiological action will be manifested more slowly. The powerful effect of calomel used subcutaneously is universally conceded; four to six injections, made at intervals of about a week, succeed in nearly all cases in producing a long-lasting cure. These injections, however, are excessively painful. The suffering may last unbroken in its intensity for forty-eight hours. A further objection lies in the fact that abscesses very frequently follow. Moreover, mercurial stomatitis is extremely common; poisonous symptoms referable to the bowels occur occasionally, and cases are on record in which the effect of the drug was so powerful that death resulted. The suspension of calomel in olive-oil has been recommended as giving comparatively little suffering. Yet even with this preparation patients complain bitterly.

Von Lang has suggested gray oil as an injection. This is prepared by mixing, according to his formula, 3 parts of mercury and 3 parts of lanolin with 4 parts of olive-oil, making a 30-percent. solution. Neisser and Balzer have modified this formula. Two cases of death are reported, due to mercuric poisoning after injection of the gray oil. Locally, the best of all insoluble preparations of mercury is the yellow oxide, first commended by Watraszewski; 1 gramme (15½ grains) of the yellow oxide of mercury and .25 gramme (4.00 grains) of gum arabic are suspended in 30 grammes (7½ drachms) of water. The preparation must be kept in a dark place, and most minute antiseptic precautions should be taken when injecting. The irritant effect is locally very slight. Severe enteritis has developed, however, several times. In conclusion, mercuric solutions are to be preferred to suspensions, since they are less dangerous both in their local and general action. Their quick elimination prevents the symptoms of mercuric poisoning from being either severe or prolonged, and the pain of the injections is very slight. More injections, however, are required if a soluble salt is used. The choice of the solution depends upon the rapidity with which the physician wishes to affect the system. If it is absolutely imperative to limit the syphilitic process at once, the formamide of mercury or combination of mercury with blood-serum, or the peptonate, the albuminate, or, finally, the sublimate-salt solution, may be used.

Lesser⁸⁴ has made 500 injections of different insoluble mercuric preparations. Twelve times dysenteric symptoms appeared. In 3 cases, after intra-muscular injections, there was apparently an embolic infarction of the lungs. He objected to injections because there is a slow and continued absorption, which, even should toxic symptoms develop, cannot be limited.

Kaposi⁸⁴ reports a case in which, within seven weeks, 2.15 grammes (33 minims) of gray oil containing .72 gramme (11 grains) of mercury were injected into a woman. Albuminuria appeared after the first injection. A week after the completion of the cure the patient developed stomatitis and diarrhœa. At the autopsy all the conditions denoting mercurial poisoning were found, together with much of the drug still about the seat of injection.

Hatherly²⁴ advises the use of ergot in the night-sweats of syphilis. Full doses of the drug must be given.

Wilson³⁷ gives Bamberger's formula for hypodermic injections as follows: Dissolve 1 grammie (15½ grains) of peptone in water; add 5-per-cent. solution of corrosive sublimate till 1 grammie (15½ grains) of corrosive sublimate has been used. Dissolve the precipitate thus formed by the further addition of a 60-per-cent. solution of sodium chloride. Add distilled water till the solution contains 1 per cent. of corrosive sublimate and 1 per cent. of peptone; 0.01 grammie ($\frac{1}{100}$ grain) of corrosive sublimate constitutes a dose.

Klotz⁵⁹ read a paper before the American Dermatological Association, entitled "Clinical Observations on Injections of Insoluble Mercurial Salts in Syphilis." The reader was aware that in this country the treatment was considered one for emergency, and was not looked upon favorably as a method for general use. Little objection had been found on the part of any of the patients, and many were much pleased with it.

Two hundred and ten intra-muscular injections had been made upon 23 different patients. Calomel, the yellow oxide, and the salicylate of mercury were all tried, but the yellow oxide was the most used, in the strength of 1 to 30, suspended in water, olive-oil, or vaselin. An average of 10 injections was made for each patient. Two abscesses were produced, each following an injection of calomel suspended in water. None followed when it was suspended in oil. Affections of the skin were almost always favorably impressed by the injections, and the results in general were so encouraging that Klotz does not feel inclined to give up the method. Taylor thought it would not often be necessary to resort to intra-muscular injection; still, the method might be good for certain emergency cases. There are too many dangers to permit of a permanent adoption of the method. Morrow regarded it as a reserve treatment where others were contra-indicated. Zeisler did not think the method applicable to cases in general or practicable. Sherwell thought the dosage inexact. Bronson thought it a scientific means of treatment the application of which we had not yet fully mastered. Heitzmann had obtained painful nodules when the greatest antiseptic precautions had been used.

Thermic Medication.—Kalashnikoff^{1019 697}
p. 48; Nov. observed on 31 patients the effect of heat applied to the surface where there were universal syphilides; the most affected limb of the patient was

placed in a hot bath (37° R.— 115° F.) for half an hour, twice daily. During the intervals warming compresses were kept wrapped about the parts. Where the lesions were in such portions of the body that baths were impracticable, hot fomentations, or the hot-water bag (35° to 40° R.— 111° to 122° F.) were applied for an hour, twice daily, the treatment during the intervals of application being the same as before. In one group no mercurials were used; in the other, inunctions or injections of mercury, with or without the iodide of potassium, were employed. Kalashinkoff's conclusions are: 1. Heat, applied locally, powerfully promotes the resolution of syphilides in the region treated. 2. Syphilides of all kinds disappear more rapidly under the influence of heat (37° R.— 115° F.) than under that of a mercurial treatment. The primary indurated sore is resolved in from eight to sixteen days, without leaving any sclerosis; roseola and papular erythema, in from four to eight days; papules and superficial impetiginous syphilides, in from eight to twenty-one days; non-ulcerating tubercles and gummatæ, in from seven to twenty-four days; ulcerating ones become cicatrized in from one to six weeks; periostitis disappears in from one to twenty-four days; osteoscopic pains subside in from three to eight days. Commensurate with these local changes, the patient's general condition is markedly improved. 3. By the use of heat and mercury a more-rapid absorption is promoted than by the use of either agent alone. 4. In cases of relapse the comparative immunity of parts treated by heat is striking. 5. Heat is especially indicated in such obstinate condylomatous lesions as refuse to yield to mercury or iodides. 6. Heat is contra-indicated in those whose weakness is so great as to render dangerous the necessary mechanical disturbance, and in case of moist papules, where dusting with calomel will be found more satisfactory.

General hot baths (33° or 34° R.— 106° to 109° F.), of ten or fifteen minutes' duration, act favorably upon syphilitic manifestations, especially when followed by packing in woolen blankets.

Usass has, to an extent, confirmed the accuracy of these conclusions, while Fisher argues that syphilis can be actually cured by heat.

Tarnovsky,⁵⁸⁶ Nos. 5, 9 while admitting that local applications of heat will cause rapid disappearance of the syphilide, states that after this treatment the disease is peculiarly prone to attack the viscera,

producing exceedingly grave lesions. Hence, the latter repudiates the treatment of syphilis by heat.

GENERAL THERAPEUTICS.

W. R. Gowers,² in concluding some lectures on syphilis, stated his belief that there is no real evidence that syphilis ever is, or ever has been, cured, saying that the shortest way to state this fact is to say that syphilis is an incurable disease, instanceing that by incurable we mean there is no proof of cure. He says that the conclusion that the essential element in the disease resists treatment and runs its course unconfined by our efforts is in harmony with what we know of other specific diseases due to a poison introduced from without and communicable from one person to another. There is not any fact to show that a single disease of this kind can be cut short. Gower's lecture called out a number of communications from various specialists in nervous and in venereal diseases, the majority of whom disagreed with Gowers, and believed that the possibility of re-infection establishes the possibility of a cure.

Karl Szadek, of Kiev, collaborator,¹³ _{June; No. 14}⁵²⁰ obtained good results in 20 cases of chancre from the use of iodol, and still more favorable results in cases of tertiary ulcerations. The internal use was also found advantageous in 22 tertiary cases.

Szadek also considers the salicylate of mercury²⁸ _{v. 7, p. 457} as at once the most useful and the least objectionable mercurial preparation. I. Hoffman²⁸ _{v. 7, p. 292} records unsatisfactory results from hypodermic injections of calomel.

S. Rosolinus²⁸⁷ _{v. 9, p. 525} thinks that the best treatment for syphilis of the mouth and pharynx consists in the use of sublimate injections without any local treatment, avoiding irritation of the mucous membrane of the mouth. He states that such ulcerations disappear after three to five injections each of 0.01 gramme sublimate, although having resisted for several months combined local and general treatment. He is of the opinion that hypodermic injections prevent relapses more than any other method. Of 203 patients thus treated only 2 had relapses. Less pain was produced by the injections when they were made in the back from the inferior angle of the scapula to the lumbar region.

I. W. Runeberg⁶⁹ _{v. 8} reports a case of death of a 34-year-old

anæmic, weak woman after three injections of 0.1 calomel, each, with dysenteric symptoms.

I. Jahn ³⁷⁰_{p.105,88} found mercury in the organs of a fœtus at full term dying suddenly during the treatment of the syphilitic mother by calomel injections. Odmansso records the death of the fœtus in the seventh to ninth month of pregnancy in 6 out of 10 pregnant women treated in that way. Neisser ⁸_{July 11} reports a case of acute lethal poisoning by hypodermic injection of "oleum cinereum." It occurred in a woman who had received during seven weeks 2.15 grammes (33 minims) of the "gray oil."

Albert Neisser ¹¹⁶_{June} strongly recommends prolonged courses of treatment for four or more years, with intermissions, and without regard to the activity or latency of the disease. The treatment is alternately energetic and mild, and is begun only after the diagnosis is assured.

Edm. Lesser ¹²³_{Mar. 15} approves of excision of chancre, but does not begin the treatment before the eruption of general syphilis except in a few cases of dangerous localization of the primary infection. I. Ehrmann ¹⁶⁹_{May} recommends general sublimate baths. After bathing for one to one and a half hours, the patient is wrapped for one or two hours in a sheet which has been in the bath-tub. Around the wet sheet a dry cover is applied.

Denenicki ⁵⁸⁶_{No. 21} records the treatment of 178 cases of syphilis by means of quinine together with mercurial inunction. In some cases the quinine appeared to enhance the value of the mercurial treatment to a very remarkable extent; in others it appeared to be of no advantage. This method of treatment was most successful where considerable variations of temperature, pulse, and weight existed. The quinine was given in doses of from 15 to 22 grains (0.97 to 1.30 grammes) *per diem*. In many of the successful cases there had been a great deal of ulceration; this rapidly improved, the temperature fell, and the general condition underwent a marked improvement; but if the quinine was stopped the patient often became worse again. It should be said that care was taken to exclude cases in which there were any traces of malarial fever.

Gustave Mahé ¹⁴⁷_{Nov.} recommends the biniodide of mercury alone, or in combination with iodide of potassium, as the best mercurial preparation to use in treating syphilis, because: 1. It is a stable compound permitting absolute accuracy in dosage. 2. It is as

powerful a tonic as any mercurial preparation. 3. It is nearly twice as effective as a germicide. 4. The quantity of mercury exhibited can be reduced to a minimum, the dose being small. 5. It is not decomposed by nor does it interfere with the simultaneous administration of iodide of potassium, when such a combination is necessary. 6. There is no danger of poisoning a patient by the possible change into other substances.

Experiments on the use of ichthyoil in the treatment of syphilis, in the clinic of Gibello, of Turin, led Peroni⁴⁹⁷ to regard ichthyoil as a valuable adjuvant in the treatment of diseases of this class. Of the 28 cases treated 12 were primary sores, 4 were desquamative, 2 pustular, and 3 papular syphilitides; 3 were cutaneous gum-mata and 4 were severe specific adenopathies. In these ichthyoil was given internally in doses of from $\frac{1}{2}$ to 2 grammes (7 $\frac{1}{2}$ to 31 grains) daily, and externally painted over the specific lesions in aqueous or ethereal solution in the strength of 5 per cent. or more, or even used pure. The best results were obtained by combining it with salicylic acid. It was well borne, and prevented the occurrence of stomatitis when used with mercury in deep injections.

Güntz, of Dresden,²⁸³ again brings to the notice of the medical profession the virtues of the chrome-water method of treating syphilis. The impossibility of finding any universal remedy for the disease is granted, and "the oft-repeated failure of mercury to accomplish a cure" is dwelt upon. According to this writer, 82 per cent. of the patients treated with mercury suffer from relapses, while chrome-water often aborts the disease in its earliest stage! It is always efficient!! Under its use syphilitic parents beget sound children!!!

Edouard Lang⁶⁵⁰ writes that, while the investigations of Lustgarten on the syphilis bacillus are very important, the results are as yet of little use in influencing practice, but indicate that the initial manifestation should be extirpated, if it is distinctly limited and if the removal can be done without any mutilation, while there are no symptoms of general disease, and if no other parts of the body are infected by the contagion. For general syphilis Lang prescribes "gray pills" internally, and applies to children emplastrum hydrargyri oleinica.

Lang prefers the treatment by inunctions and by deep subcutaneous injections of gray oil (oleum cinereum) and calomel. The

latter seem sometimes to have a better effect than the former. Lang's gray oil (*oleum cinereum*) contains 3 parts lanolin, 3 parts mercury, and 4 parts olive-oil. For calomel injections he takes lanolin 2 parts, calomel 3 parts, and oil 3 to 6 parts.

Oscar Lassar, of Berlin,⁶⁹ strongly favors continuous treatment, and is of the opinion that excision of the chancre is of great value. He makes it painless by the injection of a little 5-per-cent. solution of cocaine before the operation. After the operation he begins immediately with the general treatment. He believes the hypodermic injections of the insoluble preparations of mercury, such as calomel, to be dangerous, and reports some bad results therefrom. He prefers injections of corrosive sublimate, using iodide of potassium at the same time. He is in accord with Senator in recommending also systematic massage of the glands and muscles with green soap, in a warm bath every day, if possible, with the addition of 3 to 4 per cent. of salt to the bath.

TERTIARY SYPHILIS.

Relative Frequency.—Neumann²⁴⁵ thinks that, from his personal experience, the most efficient causes of tertiarism are:—

1. Insufficiency of treatment, both as regards dose and duration.
2. Constitutional vices, such as tuberculosis, serofullosis, scorbutus.
3. All the causes of physiological misery.

The intensity of the tertiary lesions, he believes, is independent of the nature of the initial sclerosis or of the secondary manifestations.

Drysdale says that it is principally for the reason that he has come to consider mercury as possessing a prophylactic power against the tertiary symptoms that he has given up treating syphilis without mercury,—a practice he had pursued for quite a number of years.

Maurice says a man has eighty or ninety chances in a hundred to escape tertiary lesions, unless the disease has broken out in a new geographical region, previously free, and an endemo-epidemic is established. Then the chances increase greatly. Tertiary lesions come early in these endemo-epidemics, as they do also in hereditary syphilis. The mean average time is between the third and sixth year of the disease. Cerebral syphilis occupies the first rank in point of frequency as well as gravity.

Fournier thinks the question a very difficult one to decide. He draws his conclusions from twenty-nine years' experience, in which time he has treated 2600 cases of tertiary syphilis in private practice, that tertiarism may be precocious, even to showing itself in the first month of the disease; and, on the other hand, that the numerical maximum of its manifestations corresponds to the first years of the diathesis. The relative frequency of tertiary manifestations undergoes a considerable ascension from the first to the third year, when it attains its maximum.

The most curious and most important results of his researches are the extraordinary figures that the nervous manifestations attain in the tertiary stage of the disease. There is a total of 1085 cases of various affections of the nervous system developed in the course of, and because of, the tertiary syphilis. This number is greater than that of cutaneous manifestations or of the syphilides of mucous membranes all combined. Of all the organs, it is the nervous system which, without possible contradiction, is the most affected by tertiary syphilis.

The Contagion of Syphilis During the Tertiary Period.—At the Congrès de Dermatologie et de Syphiligraphie, Landouzy ¹⁵²_{Aug. 10, 15, 24, Oct. 5} ⁷⁶⁰ reported the 2 following cases: In the first, a male syphilitic married three years after the appearance of the last specific symptom, and communicated a vaginal chancre to his wife. The second case was a man who had been treated twenty years previously by Ricord; had just been married, when, after a few months, he presented a lesion on the penis, which Fournier diagnosed as a gumma; this patient communicated syphilis to his wife. Hardy made mention of 2 similar cases. Fournier relates the case of a man, who, having had syphilis fifteen years previously, married while at the time suffering from an ulceration of the tongue which had proved obstinate to all treatment. As this patient indulged in smoking to a great extent, notwithstanding the advice of Fournier, he, in two year's time, communicated the disease to his wife, who presented a chancre of the inferior lip.

HEREDITARY SYPHILIS.

Fournier, ¹⁴_{June}, in a remarkably thorough series of lectures upon the subject of the inheritance of syphilis, states that the disease manifests itself in ways far more varied than are usually conceded.

The manifestations may be arranged under five heads, as follows : 1. The accidents of syphilis properly so called. 2. Foetal cachexia, terminating, in one of the various ways, in physical break-down. 3. Dystrophic affections, which may involve a portion or the whole of the body. 4. Congenital malformation. 5. Morbid predisposition. A distinction is made between foetal and infantile syphilis, lesions which appear after birth being classed in the latter category. The disease may be latent even up to the 20th year of life. Together with these characteristic lesions of the disease, Fournier believes that syphilis may so profoundly affect the organism that symptoms of most diverse character and apparently unconnected with the specific trouble may develop. Such symptoms he terms para-syphilitic. Under the head of foetal cachexia he places the cases of premature foetal death, or of death shortly after birth, the child at times appearing healthy, but possessing vitality of an exceedingly low resisting power; again, the child may be emaciated to an extreme degree at birth. Under dystrophic troubles are placed many cases of retarded and arrested development, such as delayed puberty, or as the condition termed "infantilism," where the years of the patient alone denote that the age of childhood has passed. Under congenital malformations he classes, as attributable to syphilis, such perversions of growth as club-foot, spina bifida, hare-lip, hydrocephalus, etc. As an instance of morbid predisposition, he cites the fact that syphilitic infants are especially liable to affections of the nervous system. Again, syphilis is a distinct causative factor in the development of rickets, and it is clearly demonstrated that among children afflicted with hereditary syphilis scrofulo-tuberculosis is rife. Fournier states that hereditary syphilis is more commonly transmitted from the mother to the child. The paternal transmission of the disease is more frequently denoted by the death of the child than by symptoms of syphilis. Although the disease is not transmitted in every case where the father is syphilitic, and hereditary syphilis of paternal origin is rarely betrayed by the birth of syphilitic children, yet its effects are more disastrous, since the percentage of disease in men is vastly greater than in women. Out of 500 syphilitic families 487 men and 13 women were affected. The father may not only infect the child directly, but may infect the mother through the child.

Congenital syphilis may be derived from the father alone, from

the mother alone, or from both parents. Paternal heredity is by far most common; the number of cases of maternal heredity is comparatively very small. Maternal heredity, however, is infinitely more virulent than that derived from the father, while mixed heredity (that is, derived from both parents) represents the greatest intensity of the disease as manifested in the child. As instances of this, 13 marriages, the woman alone being syphilitic, resulted in 28 pregnancies. Of these, there were 6 miscarriages, 15 children carried to full term but dying shortly after, and 7 living children, of whom 3 only were free from evidences of the disease. Fournier finds, from his large collection of cases, that paternal heredity has shown itself transmissible in 37 cases out of 100, maternal heredity in 84 cases, and mixed heredity in 92 cases out of 100.

In regard to the *mortality* of hereditary syphilis, when derived from the father alone, 28 per cent. of the offspring perish; when from the mother alone, 60 per cent.; when from both parents, 68.5 per cent.

As to the period in which syphilis is most liable to be inherited, the maximum influence of the disease is exhibited during the first years of infection. The maximum of this maximum corresponds to the earliest period of the diathesis,—that is, during the first year. After the third year the hereditary influence becomes less marked, but its rate of diminution is not so rapid as between the first and third years. An important question at once arises at this point as to whether there is a period after which hereditary influence is no longer exerted. It is universally admitted that after a certain number of years the disease becomes greatly weakened and its hereditary influence frequently becomes completely extinct, or, at the most, exerted in such a feeble manner as scarcely to be detected. It is unfortunately true, however, that syphilis may preserve its power of hereditary transmission for many years. This is certainly rare, but it is well authenticated. Out of 562 cases, Fournier finds 60 which have been inherited after the sixth year of infection on the part of one or both parents. In regard to the transmission of syphilis from the father to the child, Fournier holds that the clinical evidence in favor of this point is overwhelming. The influence of this paternal syphilitic inheritance is manifested more frequently by the death of the child than by the

transmission of the disease to it. The effect of treatment profoundly modifies the hereditary manifestations of the disease. Whatever may be the source of syphilis, either father or mother being affected, or both, under the action of specific treatment (attenuation) absolute extinction of the disease may frequently be seen. Fournier states as an axiom that, by mercury and time, every physician can, save in very exceptional cases, make out of a syphilitic man a husband and father free from all danger of conveying infection. A grave syphilitic infection on the part of the father does not necessarily indicate hereditary consequences of a corresponding gravity, but the benignity of the affection, as seen in the parents, by no means indicates a corresponding benignity when transmitted to offspring. Of 1127 pregnancies occurring in 500 families affected with syphilis, 46 per cent. terminated in abortion, early death, syphilitic infection, or in one of the many conditions characteristic of the disease. The *mortality* was 42 per cent. Six hundred healthy living children were born. As to the possibility of transmission of hereditary syphilis in the second generation,—that is, for instance, the birth of a syphilitic child by the healthy daughter of a syphilitic father, the disease apparently skipping one generation,—there is not yet sufficient evidence to establish this statement as a scientific truth. As for the prophylaxis and treatment of hereditary syphilis, the future father must undergo prolonged treatment. He must be instructed as to the danger which his children run: marriage must be forbidden until there is clear evidence that the disease is so attenuated that he is no longer dangerous as a husband or father.

Jacquet¹⁰⁰ _{May 13} states that syphilitic pemphigus, formerly considered as peculiarly characteristic of the hereditary forms of this disease, should really be placed in the group of polymorphous papular syphilides, of which it is simply a variety, occasioned by the condition of the skin in the last days of foetal life or the first moments of extra-uterine existence. The polymorphous papular syphilide must be considered as most distinctive of hereditary infection. Under this heading are included maculo-squamous (the so-called roseola), bullous (pemphigus), papulo-erosive (mucous patches of the skin), circinate, psoriasiform, and erosive eruptions. The most frequent lesions on mucous surfaces are labial fissures, bucco-lingual plaques, and genital plaques, and probably also

coryza. The acneiform eruption is distinct of itself, and, although rarely described, is not infrequent. The so-called lenticular syphilide has lost its specific characteristics, and belongs properly to the vesicular erythema. The phlegmonous syphilide is really an infectious erythema or a diffuse phlegmon, and should not be classed as a specific eruption. The ulcerous syphilide is unanimously considered as a simple complication of the various forms of syphilitic eruption. The specific nature of the squamous-erythematous eruption, the vesiculo-pustular lesions, and of the tubercular or gummatous manipulations is not yet definitely ascertained.

Pterygoid Plaques.—Certain ulcerations of congenital syphilis, occurring upon the soft palate, have been designated pterygoid plaques.¹⁰⁹ *Sevestre*, in describing these, states that there are always two, symmetrically situated upon the vault of the palate, behind and within the alveolar arch, at the point where the pterygoid apophyses form a projection. The plaques are roundish or oval, rarely attaining the size of a centimetre (0.39 inch) in their long diameter. They are slightly elevated and yellowish white in color. Later, there is a loss of substance, and, finally, they become deeper, brownish in color, and bleed easily. They remain stationary a certain length of time and finally heal.

Sevestre also mentions labial fissures as frequent congenital symptoms. They may be median, commissural, or general, and are fairly reliable evidence of the existence of syphilitic disease.

Conceptional Syphilis.—Fournier⁹⁰ describes conceptional syphilis as a constitutional disease without the usual primary chancre, characterized by constant and severe headaches, an exanthema which is generally erythematous-papular, and alopecia. Sometimes there are also mucous patches. These characteristic symptoms were observed in 9 out of 10 cases. The husband may present no external signs of syphilis, and, even if he did, the true explanation of his wife's symptoms may be overlooked. The headache may be called neuralgia or megrim. Even condylomata about the anus have been supposed to be piles due to pregnancy. According to Diday, conceptional syphilis may be developed in twenty-one days. Thus, an abortion may occur too early to be recognized. It is no wonder, therefore, that conceptional syphilis is so often not even suspected. After quoting the inoculation experiments of Caspary and Neumann, Fournier concludes with a

statement of the Colles-Baumes law, to the effect that the mother of a child which has inherited syphilis from its father cannot be inoculated with syphilis, because she has recently been syphilitized. Morel-Lavallée¹⁷ has been requested by Fournier to re-examine the claims of Colles to the law called on the Continent by his name. He concludes, from an examination of the original text of Colles's work, that the so-called Colles law was discovered by Baumes and formulated by Diday.

Barthélémy²⁸⁷ Mar. reports a case of the alleged occurrence of hereditary syphilis fourteen years after the infection of the parents. The patient was a child of 4 months, covered with papular syphilides, some scabbed, some erosive, and others hypertrophic. In spite of the abundant eruption, the general condition of the child was good, there being no osseous or appreciable visceral lesions, or subcutaneous gummas. The history of the child's parents was interesting in that it showed that syphilis could be transmitted to offspring fourteen years after the primary lesion. Both parents had had syphilis fourteen years ago. They were married at the age of 18. For their disease they were insufficiently and irregularly treated. For three years they had no children, and then they had a daughter at full term, who died of meningitis at the age of 7 years. A second child died at the age of 7 months with some sort of eruption, and the third, at 9 months, of infantile cholera. The fourth died on the twenty-fifth day of broncho-pneumonia. The fifth child developed, three days after birth, an interstitial keratitis of the left eye, but lived, remaining small and thin. The sixth child, the one shown at the clinic, born fourteen years after the parents acquired syphilis, developed, three months after birth, the indubitable lesions already narrated.

Sevestre⁷³ Dec. 8 to 29, '88; Jan. 3 to 26; Feb. 29 has made an elaborate study of the early manifestations of congenital syphilis, with special reference to their diagnosis. Considering the question whether or not there are in the foetus, expelled prematurely, any symptoms which warrant the diagnosis of syphilis, he answers this question in the affirmative as to certain cases, but says that in the majority the evidence is only presumptive. He then considers the symptoms of syphilis existing at the moment of birth and those which develop later. The article is a monograph upon the subject, but does not contain any original observations.

Edwin E. King²⁴⁵ Sept. publishes a case in which he believes there was evidence of hereditary syphilitic transmission through two generations. He thinks that the history of his case shows that the husband was, and always had been, free from venereal taint; that the mother had inherited syphilis, which she transmitted to her children, who, in turn, re-infected her; and that there was, therefore, an apparent exception to Colles's law. The history of the case did not confirm these remarkable statements, but pointed much more strongly to the theory that the mother had acquired syphilis, if not from her husband, then from some one else.

Landouzy, of Paris,²⁴⁵ Nov. cited 2 cases of syphilitic contagion in the course of the tertiary stage. The first was a syphilitic who, since five years, the date of his initial lesion, had exhibited no manifestations, but who, nevertheless, communicated syphilis to his wife. The second case was that of a man affected with a gumma of the penis, and who infected his wife. Hardy had seen 2 cases which confirmed the statement of Landouzy as to the possibility of contagion without any external manifestation. Fournier and Arnozan had seen cases of contagion of syphilis during the tertiary stage. Balzer alluded to the fact that mucous patches might manifest themselves almost indefinitely in successive crops. This was probably the explanation of the transmission of syphilis during the tertiary stage. Five cases of syphilis, contagious in the late tertiary period, are reported.¹⁵²

Neumann,⁸ Jan. 24 to Feb. 23 after a very careful study of 102 cases of hereditary syphilis, came to the following conclusions:—

1. A syphilitic mother may convey the disease to her offspring at any stage of her affection, whether the infection had taken place before or after the conception.
2. A mother who had contracted the disease after conception sometimes transmitted it to the fetus.
3. In the case of pure post-conceptional syphilis the transmission of the affection to the child was extremely rare, and particularly when the mother had become infected in the last months of pregnancy.
4. When the infection of the mother had taken place after conception, and the father was syphilitic at the time of procreation, the effect on the offspring was greatly intensified; the children in these cases died *in utero* or were born with signs of syphilis.
5. In the case of post-conceptional syphilis, where the infector was unknown, the proportion was the same as in pure post-

conceptional syphilis; syphilis acquired in the last months of pregnancy was usually transmitted to the offspring. 5. When the infection and conception occurred at the same time, the children died in one-half of the cases. It was, nevertheless, remarkable that a great part of the offspring remained free from syphilis, in spite of the fact that the disease was in an active state in both the parents at the time of conception. This disproved the assertion that a healthy child could never be born when both parents were syphilitic at the time of conception. On the other hand, the assertion that healthy children were born only when the syphilis of the parents was seven years old was also negatived. 6. In the case of infection before conception, the period at which conception occurred had to be taken into account; the longer the interval between infection and conception, the more favorable was the prognosis for the offspring. 7. The offspring had the best chance when the mother only contracted syphilis in the last months of pregnancy, while the father was healthy at the time of procreation. 8. The last observation also elucidated the question as to paternal syphilis. It was especially these cases in which the father was syphilitic at the time of procreation, and the mother became infected only after conception, and the child was soon after the infection born in a macerated condition, which proved the extremely injurious nature of paternal syphilis. This was opposed to the observations of Boeck and Dewerc, who stated that the child of a syphilitic father was always healthy. These data, concluded Neumann, showed the sad fate of the children of syphilitic parents, as, out of 109 cases, only 44 were born healthy, and, according to inquiries made by Friedinger, director of the Vienna Foundling Hospital, only the minority of them lived.

Fortunet²¹¹ presents a case of late hereditary syphilis in the person of a young man of 20 years. Of the accuracy of this diagnosis there is some doubt, but the case seems to have been thoroughly worked out, and Horand agrees with the author.

Bonnaud²¹² reports the case of a young girl, aged 25, who exhibited the lesions of late hereditary syphilis. Large doses of iodide of potassium were given, 90 to 160 grains (5.83 to 10.36 grammes) daily for several weeks. A gumma in the frontal region disappeared, the osteoscopic pains ceased, and the patient gained rapidly in weight.

Le Pileur,¹¹ in an article on infantile mortality from syphilis at St. Lazare, reports as follows: Fourteen per cent. of the women were subjects of syphilis. Not more than 7 per cent. of the children of syphilitic mothers outlived the first few months of existence. Out of 64,657 births (annual rate for Paris), 9,051 infants would be born of syphilitic parents, and of that number 8,418 either die *in utero* or shortly after birth. Thirteen per cent., therefore, of the total births perish from the effects of parental syphilis.

VACCINO-SYPHILIS.

Hervieux³ reports 5 cases of syphilis in infants due to vaccination by means of a scab taken from an apparently healthy child, but who was, according to Fournier, certainly suffering from latent syphilis. Fournier¹¹ states that syphilis does not necessarily develop from the virus taken from a syphilitic and inoculated into a healthy body. Cory made four attempts at syphilitic vaccine inoculation upon himself before he succeeded in producing a chancre. It was by means of inoculation of pure blood that he attained the latter end. The chancre may result, however, if the subject from which the virus is taken is either in the latent or incubating period of syphilis. The blood is apparently the agent by which the vacinal syphilis is transmitted. The virus from a syphilitic vaccination lesion may produce the vaccine pustule alone, the chancre alone, or both in combination. The ulcerous vaccination lesion must be diagnosed from the vaccino-chancere, as must those syphilitic manifestations which may follow vaccination, though, etiologically, quite distinct from the latter.

EARLY VIRULENT SYPHILIS.

Baudouin¹²⁶ states that in syphilis very grave symptoms may develop at a comparatively early stage of the disease,—that is, in the first or second year following chancre. To this form the name precocious virulent syphilis may be given. There are three types: 1. A secondary syphilis, characterized by exaggeration of the general symptoms of the secondary period, often by fever, and especially by the phenomena of malnutrition and serious anæmia. 2. A malignant form of the disease, characterized by intense infection, with grave lesions of the tegument and of the viscera. 3. Early visceral syphilis. In this form the visceral lesions, which

usually appear as late tertiary manifestations, develop at once. These various types of syphilis are not rare; even the appearance of tertiary symptoms before the third year is more frequent than is generally believed. The precocious manifestations of virulent syphilitic infection are observed chiefly among individuals previously debilitated. Alcoholism, scrofulo-tuberculosis, all causes of either moral or physical depression, act as predisposing factors. If these forms of syphilis are not fatal they produce irreparable damage, and render the body susceptible to all other forms of infection. Therapeutics should be active, specific, and reconstructive.

LATE SYPHILITIC PHENOMENA.

Syphilitic Tumors of Muscles.—Bramann^{69 Jan. 21} brought 2 cases before the Berlin Medical Society, January 23d. He said that these growths generally make their appearance near the points of bony attachments of muscles, whence some have considered them of periosteal origin. But they are often found in the centre of muscular tissue, as in the first case: A woman, aged 31 years, six years married, but never pregnant, had noticed, three months ago, a swelling upon the right side of the neck, soon followed by one near the clavicle. The older tumor was about the size of a walnut, of a firm consistence, and not situated in the neighborhood of a bone. In the second case the infiltration was of a more diffuse character—the so-called myositis fibrosa. The other patient, a man, was infected in 1874. In June of last year a tumor appeared upon the left side of the neck. It was painless, but grew constantly; was of a board-like hardness, and extended from the base of the skull to the scapula. Absorption under the anti-syphilitic treatment was more rapid in the first than the second case.

Köbner^{69 Aug. 22} reports the case of a woman, 58 years of age, with syphilitic infiltration of the left sterno-cleido-mastoid muscle throughout its whole length. The condition was painless. It was associated with other syphilitic symptoms, such as a perforation of the nasal septum. A cure was effected by mercurial inunctions and iodide of potassium in small doses.

Syphilis and Leprosy.—At a recent meeting of the Imperial Royal Society of Physicians of Vienna, Kaposi^{2 Mar. 2} showed a man, aged 31, who was the subject of combined syphilis and leprosy.

The patient came of healthy stock, but had lived for some years in regions where leprosy is usually prevalent. In 1884 he contracted syphilis. Some time before this he had noticed a small vesicle on the index finger, and beneath the finger-tip; this soon broke, leaving behind an ulcer with a cicatricial depression. Neumann treated him with mercurial frictions, iodide of potassium, and Zittmann's decoction. While undergoing treatment severe pains occurred, shooting from the right hand toward the arm and the shoulder, and persisting day and night. On some fingers of the same hand red patches were also visible. The neuralgic pains in the right upper extremity were found to be due to syphilitic neuritis.

Syphilitic Arteritis Simulating Raynaud's Disease.—Klotz^{5 Aug.} describes a case of syphilis where some of the fingers of each hand presented the characteristic features of Raynaud's disease, becoming livid, mottled, and cold.

Hutchinson has recorded a similar case in which there was a difference of ten degrees between corresponding parts of the fingers of the two hands. Klotz considers these symptoms as due to a syphilitic arteritis rather than, as in the case of Raynaud's disease, to a vasomotor neurosis.

Cancer from Syphilis.—Ed. Lang, of Vienna,^{8 No. 12} showed a remarkable case of cancer which had sprung from an undoubtedly syphilitic ulcer of the prepuce. The patient, aged 33 years, had been admitted into Lang's clinic in February of that year, suffering from a syphilitic chancre, lymphadenitis of both groins, and a syphilitic exanthema. He was treated with injections of gray oil and local applications of mercurial plaster. The buboes underwent partial suppuration and were incised and cleared out. At one period the primary syphilide on the prepuce exhibited venereal papillomata, which were removed by the application of caustic. In July, during the absence of Lang, the patient was discharged as cured. At this time the primary sore was healed, but the induration had not entirely disappeared. A few days after being shown to the Society (March 19th) the patient was re-admitted without a trace of syphilis, but presenting a large cancer of the prepuce, on the site originally occupied by the chancre, which already extended beyond the limits of the syphilitic sore, over the left half of the external lobe of the foreskin, onto the glans penis, which was ulcerated. This case is quite distinct from those not infrequent

cases in which syphilitic scars, like ordinary ones, have developed cancer. Lang was unable to find more than a dozen cases in which cancer had sprung from a primary syphilitic sore, as in the case reported here.

M. Balzer ³ _{Aug. 23} emphasizes the importance of careful inspection of the vagina for the discovery of syphilodermata, recommending that the examination should be preceded by vaginal irrigation. He believes the papular form to be the more common, but it is apparent that these must rapidly form mucous patches, which constitute the most contagious forms of vaginal syphilis.

James Nevins Hyde ²¹⁵ _{Apr. May} has reviewed very fully and ably the syphiloma of the vulva, which he carefully distinguishes from lupus, tuberculosis, elephantiasis, epithelioma, sarcoma, and fibroma. The pathology of vulvar syphiloma appears to be negative so far as concerns any identification of the special disease. The treatment should consist, in addition to the constitutional remedies, in careful cleansing and daily application of nitrate of silver if there is ulceration, and dusting with iodoform or iodol, or 1 part of hydronaphthol to 50 or 100 of Fuller's earth. The prognosis is favorable.

Weinlechner ⁵⁷ _{Mar. 10} reports a case of great destruction of the external genitals in consequence of tuberculous ulcerations engrafted upon a syphilitic basis. Patient was a woman 38 years old. The disease persisted, although vigorous antisyphilitic treatment had been tried.

Syphilitic Fever.—Fournier ²¹ _{Jan.} describes one of the rare forms of syphilitic fever which has received the name of *typhose syphilitique*, so closely does it resemble typhoid fever. He says that syphilitic fever, although so long denied, is nevertheless very frequent, especially in women. He has observed it in no less than one-third of the cases at the Lourcine Hospital. Symptomatic fever is not very common, for most lesions appear without febrile movement. However, an eruptive fever of invasion may appear with the roseola or papular syphilide. Essential fever is much more frequent, and presents two important features: first, it belongs to the secondary period, and especially to the first months of this period; and, secondly, it is much more common in women. The varieties of this fever are numerous, and marked types exist, such as the intermittent, irregular, and continuous. The intermittent

is one of the most common types. The initial stage is often absent, as well as the sweating stage. Only simple shiverings are noted, followed by a stage of heat and a terminal stage of moisture. It ordinarily occurs toward evening or in the night, and the spleen is not affected. The intermittent form passes away the most quickly, but may last as long as three months. It is the form which gives way most readily to mercurial treatment, while quinine has no influence upon it. The continued form is, perhaps, more important because of the errors of diagnosis which it is likely to cause. The temperature is usually moderate, but in some cases may reach or exceed 104° F. (40° C.). The duration may be only a few days, but it may also last for several weeks. Thus, in these cases, contrary to the current opinion, syphilis may become a pyrexial disease. In syphilitic fever digestive troubles are very slightly marked, while in simple continued fever they are the predominant symptoms; besides, the tongue has a peculiar aspect, and the fever does not last over a week. Between this and typhoid fever the diagnosis is still more important. The differential signs are mostly negative; there is absence of epistaxis, and the character of the facies is simply adynamic, with stupor. There is absence of tympanitic enlargement of the abdomen, gurgling in the iliac fossa, diarrhoea, sibilant râles in the chest, enlargement of the spleen (except in rare instances), and the characteristic spots appearing on the seventh or eighth day. A peculiar phenomenon occasionally observed in syphilitic fever is that of bulimia, coincident with the fever.

INDEX TO VOLUME FIRST.

BY C. SUMNER WITHERSTINE, M.S., M.D.,

PHILADELPHIA.

Acids, tests for.....	C. 7	Dentition, order of.....	E. 6	Dyspepsia, nervous.....	C. 12, 13
Addison's disease.....	G. 42	period of.....	E. 6	painful.....	C. 9
African fever, remittent—Black-water fever.....	H. 62	premature teeth.....	E. 7	Ectasia ventriculi paradoxa.....	C. 22
Anchylostomum.....	F. 22	relation to digestive diseases.....	E. 7	Elastic compression of abdomen.....	C. 9
Anerismatoscope, Schenell's.....	B. 6	treatment and hygiene.....	E. 8	Emphysema.....	A. 66
Aneurisms, aortic.....	B. 5	Diabetes mellitus, in adult.....	L. 1	diagnosis.....	A. 63
descending aorta, diagnosis.....	B. 6	age.....	L. 10	etiology.....	A. 66
rupture into esophagus.....	B. 8	co-existence in husband and wife.....	L. 10	pathology.....	A. 68
into pulmonary artery.....	B. 7	complications.....	L. 15	Empyema (see Pleurisy).....	A. 62
into superior vena cava.....	B. 6	lipemia.....	L. 15	Endocarditis.....	B. 11
syphilis.....	B. 5	diabetic coma.....	L. 15	infectious.....	B. 11
treatment.....	B. 8	diabetic gangrene.....	L. 17	malignant.....	B. 14
Anzina pectoris.....	B. 40	ophthalmic lesions.....	L. 17	primary ulcerative.....	B. 15
etiology and pathology.....	B. 49	pneumonia.....	L. 17	Enteric (typhoid) fever.....	H. 10
diagnosis.....	B. 51	tumors.....	L. 18	abortive form.....	H. 37
prognosis.....	B. 51	etiology.....	L. 1	association with other infections.....	H. 22
treatment.....	B. 52	morphic anatomy.....	L. 9	complications and sequelæ.....	H. 30
Arteries, diseases.....	B. 3	nature and pathogenesis.....	L. 3	diagnosis.....	H. 37
air, entrance into circulation.....	B. 3	prognosis.....	L. 14	etiology.....	H. 40
arterial murmurs.....	B. 2	symptomatology.....	L. 13	geographical distribution.....	H. 41
arterio-sclerosis and plethora.....	B. 1	carbonic-acid exhalation.....	L. 13	in infancy and childhood.....	H. 43
elasticity of healthy and diseased arteries.....	B. 3	loss of tendon reflex.....	L. 13	paralyses, post-typhoid.....	H. 35
fatty embolisms, treatment.....	B. 4	treatment.....	L. 18	pathology.....	H. 25
Ascaris.....	F. 19	dietetic.....	L. 18	sudden death.....	H. 34
Ascites.....	D. 13	flours.....	L. 18	Treatment during disease in adults.....	H. 45
treatment.....	D. 13	soya-bread.....	L. 20	in convalescence.....	H. 52
Asthma.....	A. 71	bread from embryo of corn.....	L. 20	in infants and children.....	H. 44
etiology.....	A. 72	saccharin.....	L. 20	Enuresis.....	G. 40
occurrence.....	A. 71	general management.....	L. 21		
pathology.....	A. 71	Dujardin-Beaumet's regimen.....	L. 22	Fever—pathology, general.....	H. 1
treatment.....	A. 74	Cantani's regimen.....	L. 23	prophylaxis, general.....	H. 3
Bacillus of pneumonia.....	A. 55	gymnastic treatment.....	L. 25	treatment, general.....	H. 8
tuberculosis, detection.....	A. 22	medicinal treatment.....	L. 25	antipyretic medication.....	H. 8
physical properties.....	A. 45	antipyrin.....	L. 25	cold bath in hyperpyrexia of infants.....	H. 16
Bladder, diseases.....	G. 31	opium alkaloids.....	L. 27	spraying to reduce temperature.....	H. 8
tumors.....	G. 37	aspirated lithia.....	L. 27		
Bothriocerphalus liguloides.....	F. 6	phenacetin and ephalzine.....	L. 27	Fever—new, unknown, or unrecognized.....	H. 81
Bradycardia, permanent.....	B. 35, 37	jambul.....	L. 24	eruptive, new.....	H. 81
Bright's disease.....	G. 2	creasote.....	L. 29	glandular.....	H. 85
etiology.....	G. 2	cocaine.....	L. 29	Kansas City (at).....	H. 83
pathology.....	G. 11	glycerin.....	L. 29	malignant of Brazil.....	H. 81
symptomatology.....	G. 7	of complications.....	L. 29	on emigrant ship.....	H. 84
treatment.....	G. 15	diabetic coma.....	L. 29	pleuro-pneumonic.....	H. 85
Bronchitis.....	A. 58	diabetic gangrene.....	L. 31		
etiology.....	A. 58	diabetic eczema.....	L. 33	Gall-stones.....	C. 40
pathology.....	A. 59	syphilitic diabetes.....	L. 33	Gonorrhœa.....	M. 14
symptomatology.....	A. 60	cataract in diabetes.....	L. 33	Gout.....	K. 8
treatment.....	A. 61	hygiene prophylaxis.....	L. 34	etiology.....	K. 8
Bulimia.....	C. 13	Diabetes mellitus, in children.....	L. 10	pathology and pathological anatomy.....	K. 9
Calculus, biliary.....	C. 40	duration and prognosis.....	L. 12	treatment.....	K. 9
pulmonary.....	A. 70	etiology.....	L. 10		
vesical.....	G. 38	treatment.....	L. 12	Hæmoptysis.....	A. 48
Cancer of iris.....	C. 2	Diarrhea, acute.....	D. 1	etiology.....	A. 48
Cestodes.....	F. 4	etiology.....	D. 1	pathology.....	A. 48
geographical distribution.....	F. 4	treatment.....	D. 2	treatment.....	A. 49
morphology and embryology.....	F. 4	Diarrhea, chronic.....	D. 2	Heart diseases.....	B. 41
Cholera Asiatica.....	D. 15	Diarrhoeal diseases in children.....	E. 14	arterio-sclerosis.....	B. 41
etiology.....	D. 15	diarrhoea, infantile.....	E. 14	cardiac failure and sudden death.....	B. 46
treatment.....	D. 17	etiology.....	E. 14	from overstrain.....	B. 47
Celiac affection in children.....	E. 12	prophylaxis.....	E. 20	foreign bodies.....	B. 55
etiology.....	E. 12	treatment.....	E. 21	hypertrophy.....	B. 40
pathology and diagnosis.....	E. 13	dysentery, infantile, treatment.....	E. 25	movable.....	B. 57
prognosis and symptomatology.....	E. 13	Digestive organs in children, diseases of.....	E. 1	new growths.....	B. 54
treatment.....	E. 14	Diphtheria, pertussis, and parotitis.....	J. 1	obesity, abnormal rhythm in.....	B. 40
Colorado, phthisis resort.....	A. 28	Diphtheria.....	J. 1	prognosis, general.....	B. 28
Constipation, adult.....	D. 2	pathology and etiology.....	J. 1	mitral disease in children.....	B. 35
infantile.....	E. 25	prophylaxis.....	J. 3	rupture.....	B. 52
Coronilla scorpioides.....	B. 63	seizures and complications.....	J. 4	syphilis.....	B. 53
Cyrus fever.....	H. 74	treatment.....	J. 4	therapeutics.....	B. 57
Cystocercus.....	F. 17	Diptera, larva (pseudo-parasites).....	F. 23	adonia.....	B. 61
Cystitis.....	G. 33	Duodenum, diseases.....	D. 4	alkaloids and glucosides.....	B. 57
etiology and pathology.....	G. 33	carcinoma.....	D. 5	aque ammonia fortior.....	B. 61
treatment.....	G. 35	ulcer.....	D. 4	calomel.....	B. 63
Delirium cordis.....	B. 34, 40	Dysentery, adult, treatment.....	D. 2	coronilla scorpioides.....	B. 63
Dengue.....	H. 63	infantile, treatment.....	E. 25	hydrotherapy.....	B. 84
Dentition.....	E. 6	Dyspnoea.....	A. 51	lactose.....	B. 62
delayed.....	E. 7	Dyspepsia, acid.....	C. 10	nux vomica.....	B. 62
		alkaline.....	C. 11	strophanthus, in adult.....	B. 58

Heart diseases, str. <i>phanthus</i> in child-hood...	B- 61	Pancreas, diseases of acute pancreatitis...	C- 24	Stomatitis mycotic, prophylaxis and treatment...	E- 3
vascular disease...	B- 15	chronic disorders...	C- 27	syphilis...	E- 5
diagnosis...	B- 25	cysts...	C- 28	etiology and pathology...	E- 5
cardiac murmur and nocturnal regurgitation...	B- 20	Paralysis of pneumonia...	A- 53	treatment...	E- 6
etiology...	B- 15	Parasites, animal, and their effects. protozoa (rhizopoda, sporozoa, infusoria),	F- 1	ulcerous-s. fetid, putrid, or phlegmonous...	E- 4
pathology...	B- 25	Parotitis...	J- 11	pathology and treatment...	E- 4
symptomatology...	B- 16	complications...	J- 12	Strongylus...	F- 19
treatment...	B- 57	incubation...	J- 11	Syphilis...	M- 1
voluntary control...	B- 41	treatment...	J- 11	arteritis simulating Raynaud's disease...	M- 33
wounds...	B- 55	Pericarditis...	B- 9	aner from...	M- 33
Heart, pericardium, and arteries, diseases...	B- 1	Peritonitis...	B- 9	diagnosis...	M- 4
Hydatid of liver...	C- 38	Peritonitis...	D- 10	early virulent...	M- 36
Hydropath hot pad and binder...	C- 9	diagnosis...	D- 11	fever of (<i>typhose syphilitique</i>)...	M- 38
Intestines, adult...	C- 31	etiology...	D- 10	hereditary...	M- 28
cathartical, in children...	E- 26	symptomatology...	D- 11	conceptual form...	M- 32
Letts...	D- 8	Peritonitis, tubercular, acute...	D- 13	influence of parent...	M- 29
treatment...	D- 8	clinical history...	D- 13	late lesions...	M- 34
Intestinal obstruction, acute...	D- 5	Pertussis...	J- 9	manifestations...	M- 28
clinical history...	D- 5	complications...	J- 11	mortality...	M- 30
diagnosis...	D- 6	treatment...	J- 9	period of inheritance...	M- 30
treatment...	D- 6	Phloroglucin, vanillin-test for acids...	C- 7	polymorphous syphilides...	M- 31
Intestines and peritoneum, diseases...	D- 1	Plegmaphony, new diagnostic sign...	A- 19	prophylaxis...	M- 31
Karyophagus hominis...	C- 32	Pleurisy and empyema...	A- 62	ptychoidermata...	M- 39
Kidney, abscess (<i>pyonephritis</i>)...	G- 22	diagnosis...	A- 64	tertiary...	M- 27
anomalies...	G- 19	pathology...	A- 62	- contagion during...	M- 28
cysts...	G- 23	treatment...	A- 65	relative frequency...	M- 27
diseases...	G- 23	Pneumonia...	A- 52	transmission...	M- 2
feverish...	G- 20	complications...	A- 56	treatment, specific...	M- 6
hydronephrosis...	G- 26	etiology...	A- 51	general therapeutics...	M- 24
injuries...	G- 28	pathology...	A- 52	hypodermic medication...	M- 11
physiology...	G- 1	treatment...	A- 57	local treatment...	M- 3
syphilis...	G- 29	Pneumothorax...	A- 65, 66	thermic medication...	M- 22
tuberculosis...	G- 29	Relapsing fever...	II- 63	time for beginning...	M- 6
tumors...	G- 29	Rheumatism, acute and chronic...	K- 1	tuberculosis and...	M- 39
Kidneys, bladder, and supra-renal capsules, diseases...	G- 1	etiology...	K- 1	vaccine-syphilis...	M- 36
Lactic acid, Uffelman's test...	C- 7	pathology and pathological anatomy...	K- 3		
Liver diseases...	C- 30	treatment...	K- 6		
anæmia...	E- 26	acute attacks...	K- 6		
atrophy, acute yellow...	C- 34	chronic...	K- 8		
cirrhosis...	C- 32	Rheumatism and gout...	K- 1		
gall-stones...	C- 40				
hepatitis, suppurative...	C- 35	Scarlet fever...	I- 1		
hydrotis...	C- 38	complications...	I- 1		
icterus...	C- 31	etiology...	I- 1		
melano-sarcoma...	C- 43	prophylaxis...	I- 11		
physiology...	C- 30	sequæta...	I- 13		
Lunxz's diseases of...	A- 1	symptomatology...	I- 5		
actinomycosis...	A- 73	treatment...	I- 13		
foreign body...	A- 70	Scarlet fever and measles...	I- 1		
cancro...	A- 52	Scarlet fever due to...	C- 9		
oedema...	A- 65	Sexual asthma...	A- 73, 77		
syphilis...	A- 77	Sipes phthisicus...	A- 13		
tumors...	A- 69	Splenomegaly...	A- 53		
bronchect...	A- 70	Stomach, diseases of, in adult...	C- 2		
calculus...	A- 70, 71	diagnostic methods...	C- 5		
carcino-ma...	A- 69	pathological conditions...	C- 11		
myxosarcoma...	A- 70	atrophy...	C- 17		
sarco-ma...	A- 70	carcinoma...	C- 22		
syphilis...	A- 69	cystic degeneration of mucous membrane...	C- 14		
Malar fevers...	II- 56	dilatation...	C- 18		
diagnosis...	II- 59	gastritis, phthisicite...	C- 16		
etiology...	II- 56	gastritis, phlegmonous...	C- 14		
pathology...	II- 59	neurosis...	C- 12		
treatment...	II- 60	rupture...	C- 14		
Mata fever...	II- 77	ulcer...	C- 20		
Measles...	I- 17	physiology...	C- 2		
complications—infusions, brain, varicella...	I- 20	therapeutic methods...	C- 9		
encephalitis...	I- 21	Stomach, diseases in children...	E- 8		
etiology...	I- 17	dilatation, etiology, and treatment...	E- 12		
incubation...	I- 14	stomach digestion...	E- 8		
pathology...	I- 14	stomach-washing, lavage...	E- 9		
proportion, or hemialbumose, in urine...	I- 18	Stomach, digestion tests...	A- 15		
symptomatology...	I- 17	dyspepsia...	A- 15		
Melastomaceous diseases...	A- 80	motor power...	A- 15		
melastomaceous sweating fever (<i>fever mela-</i> stomæ...	A- 74	test-mold, Klemperer's...	A- 15		
Mineral waters in gastric diseases...	C- 11	Schiernh's...	C- 7		
Mouth, diseases in adults...	C- 1	Somatics, classification...	E- 1		
cancerous...	C- 2	aphthosis...	E- 2		
xerostomia, or dry mouth...	C- 1	etiology and symptomatology...	E- 2		
Mouth, diseases in children...	E- 1	treatment...	E- 2		
stomach, pancreas, and liver, diseases of...	C- 1	catarrhalis...	E- 1		
Measles, disease of tuberculous...	A- 48	etiology and symptomatology...	E- 1		
Mysisis diptera, larva...	F- 23	treatment...	E- 1		
Nematodes (thread-worms)...	F- 19	crusting and diphtheritis...	E- 5		
Oxynts...	F- 20	etiology and treatment...	E- 5		
Yellow fever...		gangrenous-noma-cancerous-osis...	E- 5		
diagnosis and treatment...		etiology and symptomatology...	E- 5		
etiology...		treatment...	E- 5		
inoculation...		myositis-crush-sore-magnet...	E- 2		
incubation...		etiology and pathology...	E- 2		
periodic...		Xerostomia, or dry month...	C- 1		
Weil's disease...					
Xerostomia, or dry month...					

DEPARTMENT OF MEDICAL POLYTECHNICS AND
SANATORY APPLIANCES.



DEPARTMENT OF MEDICAL POLYTECHNICS AND SANATORY APPLIANCES.

PUBLISHER'S ANNOUNCEMENT.

SINCE the publication of the first issue of the ANNUAL, the publisher has been urged by many subscribers to this work to furnish, in addition to the features of its general programme, a list of reliable firms, wherein the products mentioned and recommended in the body of the book, besides other materials in constant use by the physician, could be obtained, the fact of the presence of any firm in the list being a guarantee as to its reliability. Although this suggestion remained a long time unheeded by the publisher, owing to his desire to keep the work free from all connection other than that with the profession, circumstances presented themselves rendering it the solution of a complex problem. In the first place, the letters of inquiry from subscribers, concerning the information in question, have reached a proportion that would astonish the most sceptical. This will readily be understood when the plan of the ANNUAL is remembered.

As is well known, almost all journals contain a more or less liberal supply of pages devoted to business purposes. These, while aiding, in a great many cases, to substantially support the periodical, serve not only to furnish the subscriber with information valuable in proportion to the time he has to spare in searching for the manufacturers of products he wishes to use, but they also save him the trouble of writing to the publisher for the desired information and the latter the labor and cost of answering. The ANNUAL, being deprived of the advantageous side of the question, had naturally to withstand its undesirable aspect, and, as a result, the publisher, in his desire to do all in his power for his patrons, now finds himself at the head of a "bureau of information," appalling as to labor and expense, and showing unmistakable evidences of a gradual increase. The 756 journals, 234 books and pamphlets, and the reports of 200 correspondents, of the 1889 issue, representing every part of the known world, at once suggest the extent of the correspondence, while the fact that many inquiries require two and sometimes three foreign

letters gives an idea of the cost. In short, the correspondence of the ANNUAL, in this particular, can, without fear of exaggeration, be computed as equalling that of a thousand ordinary medical journals presenting no advertising columns.

In the second place, it is not generally known that, although the subscription price of the ANNUAL is only three times that of a first-class weekly, its cost of production is fully ten times as great. Moreover, the first estimates of the cost of publication of the work have been found to have been much too low, many elements of loss in the mechanical production and in the collection of subscriptions greatly assisting in increasing the deficiency.

This series of circumstances formed a barrier to the publication of the work on the basis of the first two issues. It became necessary either to reduce its cost or increase its income. The first condition could only be fulfilled by reducing the standard of the mechanical production—paper, printing, etc., and the number of colored plates and wood-cuts. The second condition could only be complied with by increasing the subscription price or by imitating other periodicals—accepting advertisements. Of the three suggestions the last won the day. The interest of the subscribers was fully subserved,—no increase in price, no reduction in standard, while to many of them, especially those members of the profession living outside of cities or towns, it would prove of considerable advantage, as evidenced by the amount of correspondence with the bureau of information. Besides all these advantages, it would limit, to a marked degree, the work of this bureau, which, as shown in the first part of this announcement, had assumed alarming proportions.

While making this frank confession, the publisher wishes to state that in taking this step he places the ANNUAL on a basis the firmness of which will insure not only its continuation in its present form, but which will enable him to introduce from time to time such improvements as may seem desirable.

Concerning the character of the advertisements, great circumspection will be observed; evidence of this can be readily obtained by perusing the series presented in this issue. Houses of the first reliability are alone admitted,—this applying not only to their financial standing, but to general promptness and business ability in every sense of the word.



MESSRS. PARKE, DAVIS & CO., of Detroit, Michigan, manufacturers of PURE CHEMICALS and STANDARD PHARMACEUTICAL PRODUCTS, although in business scarcely a quarter of a century, are now among the leading drug-purveyors of the world, possessing unexcelled facilities for supplying the demands of legitimate therapeutics and pharmacy, and enjoying, to an exceptional degree, the confidence of members of both branches of the medical profession.

The explanation of the rapid growth of this house, which is, perhaps, without a parallel in the same line of business in this or any other country, is not far to seek. The principle was adopted at the beginning, and strictly adhered to ever since, of applying the ethics of medical practice to pharmacy. Parke, Davis & Co. have opposed the purely commercial methods commonly followed by manufacturers, and have steadily avoided the practice of protecting their medicinal preparations and discoveries by patents, trade-marks, and copyrights; nor have they ever adopted a course of secrecy toward the medical profession.

They have been the means of introducing a large number of new and valuable drugs, such as Coca and Cocaine, Cascara, Viburnum, Jamaica Dogwood, Grindelia, Manaca, Duboisia, Eucalyptus, Yerba Santa, Convallaria, Coto-bark, Cheken, Pichi and many others. In doing so they have pursued laborious scientific investigations, and have, at great expense, sent skilled botanists to different parts of the world, and the very valuable results thus obtained they have laid freely before the profession.

Among the innovations they have brought out is the class of preparations known as "normal liquids," which are standardized pharmaceutical products, in which the active principles are carefully assayed and physiologically tested so as to produce absolute uniformity in the results. These preparations respond to a growing demand for more exact dispensing of drugs by the better-educated class of physicians in conformity with the progress of medical science, and have been highly appreciated.

Among the products of their immense laboratories may be enumerated gelatin-coated pills, powders and liquids in soluble elastic capsules, pepsin of unequaled digestive activity, malt-extract of standardized diastatic power, cascara fluid extract, both ordinary and tasteless, and a full line of pure drugs and pharmaceuticals. They are large manufacturers of gelatin capsules for prescription and dispensing purposes.

MEDICAL SUPPLIES.

DRUGS are the tools of the physician. If the tools are of poor construction and inadequate to perform the work required of them, an unsatisfactory result can easily be predicted. This is illustrated almost daily in medical practice.

Is it not remarkable that so many physicians will continue to risk their reputation upon prescriptions to be filled by strangers, without having any assurance whatever that the ingredients employed shall be of the good quality, or that there shall be no omission or substitution practiced?

Attention has been called to the fact that the proportion of the active principles of vegetable drugs varies within considerable range, and some apparently very good specimens, upon examination, give very small yield of alkaloid or active principle. It is of first importance, therefore, to the therapist to have his remedies supplied by a source that shall guarantee their quality. By using drugs of this character the proverbial uncertainty of medicine is reduced to a very small and insignificant quantity, and can be omitted from the therapeutic problem.

In the case of pharmacopeial preparations there exists, also, a very great difference between the products of different manufacturing pharmacists. The sugar-coated pill, for instance, is very soluble when properly made, and directly the reverse when ignorantly or carelessly prepared.

We can thoroughly commend the products of the representative houses whose cards appear in this department. When there exists such differences as there are at present between preparations bearing the same name, the only course for a careful prescriber to follow is to specify the source of the preparation upon the prescription, by adding the initials of the manufacturer, and we do not hesitate to advise our readers to adopt this plan wherever practicable.

Galenical Preparations

MANUFACTURED BY

WM. R. WARNER & CO.

FOUNDED, 1856.

Standard and Official Preparations for Physicians Only.

THE COATING OF THE FOLLOWING PILLS WILL DISSOLVE IN FOUR AND A HALF (4½) MINUTES.



Galen.

Pil. Lady Webster.

(WM. R. WARNER & CO.)

B—Pulv. Aloes	2 gr.
“ Mastic	½ gr.
“ Rose Ivs.	½ gr.
M. ft. 1 pill.	

Lady Webster Dinner Pills. This is an excellent combination, officially designated as Aloes and Mastich, U.S.P. We take very great pleasure in asking physicians to prescribe them more liberally, as they are very excellent as an aperient for persons of full habit or gouty tendency when given in doses of one pill after dinner.

Pil. Ferri Iodide.

(WM. R. WARNER & CO.)

ONE GRAIN IN EACH.

The dose of Iodide of Iron Pills is from one to two at meal times; is recommended and successfully used in the treatment of Pulmonary Phthisis or Consumption, Anaemia and Chlorosis, Caries and Scrofulous Abscesses, Loss of Appetite, Dyspepsia, etc.

Pil. Chalybeate.

(WM. R. WARNER & CO.)

Proto-carb. of Iron, 3 grs. Dose: 1 to 3 pills.

(WM. R. WARNER & CO.'S FERRUGINOUS PILLS.)

Ferri Sulph. Fe SO₄ } Ferri Carb. Fe Co₃
Potass. Carb. K₂CO₃ } Potass. Sulph. K₂SO₄

Pil. Chalybeate Comp.

(WM. R. WARNER & CO.)

Same as Pil. Chalybeate, with ½ gr. Ext. Nux Vomica added to each pill to increase the tonic effect. Dose: 1 to 3 pills.

Pil. Digestiva.

(WM. R. WARNER & CO.)

A VALUABLE AID TO DIGESTION.

B—Pepsin Conc't	1 gr.
Pv. Nux Vom.	½ gr.
Gingerine	1-½ gr.
Sulphur	½ gr.

IN EACH PILL.

This combination is very useful in relieving various forms of Dyspepsia and Indigestion, and will afford permanent benefit in cases of enfeebled digestion, where the gastric juices are not properly secreted.

As a dinner pill, Pil. Digestiva is unequalled, and may be taken in doses of a single pill either before or after eating.

Please specify WARNER & Co, and order in original bottles of one hundred to secure full therapeutic effect and avoid the substitution of Inferior Brands. Supplied by all Druggists, or sent by Mail on receipt of price.

Pil. Sumbul Comp.

(WM. R. WARNER & CO.)

DR. GOODELL.

B—Ext. Sumbul	1 gr.
Asafetida	2 gr.
Ferri Sulph. Ext.	1 gr.
Ac. Arseniosi	1-30 gr.

“ I use this pill for nervous and hysterical women who need building up.” This pill is used with advantage in neurasthenic conditions in conjunction with Warner & Co.'s Bromo-Soda, one or two pills taken three times a day.

Pil. Antiseptic.

(WM. R. WARNER & CO.)

EACH PILL CONTAINS

B—Sulphite Soda	1 gr.
Salicylic Acid	1 gr.
Ext. Nux Vomica	¼ gr.

Dose: 1 to 3 pills.

Pil. Antiseptic is prescribed with great advantage in cases of Dyspepsia attended with acid stomach and enfeebled digestion, following excessive indulgence in eating or drinking. It is used with advantage in Rheumatism.

Pil. Antiseptic Comp.

(WM. R. WARNER & CO.)

EACH PILL CONTAINS

B—Sulphite Soda	1 gr.
Salicylic Acid	1 gr.
Ext. Nux Vomica	¼ gr.
Powd. Capsicum	1-10 gr.

Concentrated Pepsin 1 gr.

Dose: 1 to 3 pills.

Pil. Antiseptic Comp. is prescribed with great advantage in cases of Dyspepsia, Indigestion, and Malassimilation of food.

Pil. Aloin, Belladonna, and Strychnine.

(WM. R. WARNER & CO.)

B—Aloin	1-5 gr.
Strychnine	1-60 gr.
Ext. Belladonna	½ gr.

Dose: 1 to 2 pills.

Medical properties—Tonic, Laxative. Try this pill in habitual Constipation.

Pil. Arthrosia.

(WM. R. WARNER & CO.)

FOR CURE OF RHEUMATISM AND RHEUMATIC GOUT.

Formula—Acidum Salicylicum; Resina Podophyllum; Quinia; Ext. Colchicum; Ext. Phytolacea; Capsicum.

Almost a specific in Rheumatic and Gouty affections.

PIL. PHENACETINE et SALOL, 5 Grs., "W. H. S. & CO."

{ Phenacetine-Bayer, : : : : : 2½ grains.
{ Salol, : : : : : 2½ "}

ANTI-RHEUMATIC AND ANALGESIC. This combination was first suggested by Dr. M. F. Price, Colton, Cal., President of the "Southern California Medical Society." In an address to the members he says: "In a case of acute rheumatism, affecting elbows, wrists, knees, and ankles, ordered Phenacetine and Salol every three hours. No local application ordered. Made five daily visits, found the patient each day improved; discharged, with orders to continue the medicine three times a day for a week."

After citing other cases, one of Sciatica, where the patient was suffering such pain that the slightest motion caused faintness with nausea and continuous vomiting; two with acute Rheumatism, and one with Neuralgia of the stomach, Dr. Price continues:

"It will be observed that in some of these cases I have combined Salol with Phenacetine. I did this on the principle of the well-known effect of Salicylic Acid in Rheumatism, but I rely on the Phenacetine for the relief of the pain, and in this way perhaps the cure of the disease causing it." (*Southern California Practitioner*, August, 1889.)

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